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SCIENTIFIC MONISM

SCIENTIFIC MONISM

BY

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PREFACE

THE theory put forward in the first of these essays is based on the assumption that Real Existence is a substantial unity comprising the two principles of Activity and Inertia, which finally appear in consciousness under the concepts of a Psychic and a Physical principle respectively. On this view the whole process of evolution is interpreted as a progressive series of relations between these two principles, manifesting itself in a corresponding series of progressive functions known to us as the "laws" of Physical, Chemical, Vital, and Mental phenomena. These laws, exhibiting a continuous advance from a purely physical toward a purely mental character, culminate in a complete differentiation between the physical and the psychic elements, when the relationship between them becomes that final and unique relationship which we call Consciousness. Thus the Psycho-Physical Process appears to be directed toward a definite end—the emergence and development of Mind with all its spiritual values.

Though, from the nature of the case, no rigid proof of this hypothesis is possible, its logical inferences have been shown to be largely in accordance with scientific facts, thus affording the only

PREFACE

measure of confirmation which any such speculative hypothesis can claim.

The succeeding essays briefly discuss some of our fundamental ethical and intellectual concepts in the light of this hypothesis, and suggest that these concepts find therein a firmer basis than is afforded by either the Materialistic or the Idealistic hypothesis. In particular they attempt to interpret evolution in terms of Directivity, and to show that the Duality of Cosmic Law which the theory implies supports the doctrine of Free Will.

I

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i

MENTAL AND MATERIAL ANALYSIS

THE METAPHYSICAL PHASE

THE problem as to a Monistic or a Dualistic interpretation of existence appears to be as old as philosophy itself and, as far as one can judge from the conflict of opinion still prevalent among philosophers, it would seem to be almost as far from solution as ever. Perhaps this persistence may be due to the intrinsic nature of the question itself which, in the absence of any positive data furnished by science, seemed to render it susceptible of either answer according to the way in which it was looked at. A consideration of the complete disparateness of Mind and Matter, of the utterly alien character of the mental and material worlds, would inevitably suggest the Dualistic interpretation, and all philosophic speculation which tended to emphasize this aspect of the problem would evolve a Dualistic system. On the other hand, minds which were prone to dwell on the less obvious, but none the less compelling, conviction of a fundamental unity and concomitance between Thoughts and Things would reach the view that these are but two modes of manifestation of one underlying reality, and a Monistic philosophy would result. All philosophic thought has in a great measure been divided into these two camps, and, broadly speaking, it may be

said that while the ancient Eastern philosophies were mainly Monistic, the later systems of the West were mainly Dualistic or Pluralistic. And this difference may find an explanation in the difference between the respective characteristics, the genius and inspiration, of Eastern and Western thought. The Eastern sage, prone to introspective thought and subjective contemplation, evolves a mystical system in which the phenomenal world is mere illusion, and in which the individual soul or spirit is but an emanation from some one universal state of being into which it will finally be re-absorbed. This sort of philosophic system—which might be described as Psychic or Idealistic Monism—tends inevitably towards mysticism, and it reaches its final outcome in the mystical doctrines propounded by Gautama the Buddha. On the other hand, the Western philosophic mind, while necessarily and primarily concerned with subjective speculation, is forced by the gradual advance of natural knowledge to recognize and incorporate into its philosophic systems an ever-widening world of physical facts and processes. This development of Dualism may be said to have begun with Aristotle and to have culminated with Descartes.

But all these speculations were quite inconclusive. No attempt at proof or verification seems ever to have been made, and the theories of each philosopher seem to have been simply inspired by his individual mental bias or the general spirit and tendency of his age. No impartial and authoritative verdict on the question could be pronounced, for no judge capable of pronouncing such a verdict yet existed. But such judgment was destined before very long to be

delivered, and it was delivered in the name of Physical Science.

THE SCIENTIFIC PHASE

The special relevance of physical science to this world-old philosophic question may be traced back to the latter part of the eighteenth and the beginning of the nineteenth century, and its keynote is Unification. It may conveniently be considered under three main divisions.

In the first place we find that the phenomena and processes of the physical world were being subjected to scientific analysis in every direction, and that this analysis was steadily revealing an ever-deepening unification. Complex phenomena were being resolved into simpler ones. Heterogeneous structures were being resolved into homogeneous elements. All the diverse and complicated processes of nature were found to be expressible in terms of matter and motion—that is as functions of energy. Chemistry resolved matter into a few primitive elements bound together by a system of relationships which irresistibly suggested a profound community of nature and origin. Physics indicated a similar fundamental community between the various modes of energy, since each mode could be transformed into any of the others without gain or loss. The laws of motion and gravitation brought all the movements of the physical universe under a few comprehensive generalizations. Study of the earth and its fellow-members of the solar system indicated that this system originated in a physical condition of extreme uniformity and simplicity; while a study of the stellar systems revealed a

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uniformity of material and a similarity of structure probably extending throughout the entire universe. And finally, all the activities of nature, physical, vital, and mental, were interpreted as manifestations of one supreme principle which seemed to be of a primordial and fundamental character—the principle of Causality.

Turning next to the other member of the ancient Duality, we find that mental analysis, as far as it went, yielded similar results in the narrower field to which it was as yet restricted. All the mental faculties from lowest to highest were found to be interpretable as originating in simple sensations or feelings and their relations, and the various forms of sensation were themselves found to be resolvable into one primitive form common to them all—the sensation of contact. And to complete the analysis, the gap between sentience and non-sentience seemed to be bridged by the phenomenon of “unconscious sensation”. The real existence of this psycho-physical function is beyond dispute, and it may even afford a clue to the nature of reality.*

Along a parallel line of analysis intelligent behaviour was resolved into a compounding of instincts, instincts into a compounding of reflex actions, and these finally into automatic responses in which both excitation and response were equally devoid of consciousness.

* This seems to be suggested by Mr. Bertrand Russell when he says (*The Analysis of Mind*, page 306), “I believe that the realization of the complexity of a material unit and its analysis into constituents analogous to sensations is of the utmost importance to philosophy, and vital to any understanding of the relations between mind and matter, between our perceptions and the world which they perceive.”

MENTAL AND MATERIAL ANALYSIS

But even more significant than either physical analysis or mental analysis in their separate spheres was a third line of research in which both were united, and which may accordingly be termed psycho-physical analysis. This owed its origin and inspiration to the great doctrine of Evolution, and can be dated no earlier than the middle of the last century.

Here, while mental processes were found to be closely concomitant with neural processes in the individual, this concomitance was emphasized when it was found to subsist throughout the whole course of individual and racial development. The embryonic mind appears along with the embryonic nervous system. As the nervous system of the child develops into that of the adult the mind develops with it. Moreover, the phylogenetic process runs closely parallel with the ontogenetic process. Following the psycho-physical history of mankind backward through existing savage races, through primitive man, through anthropoids and all the lower ancestral stems of our species, it was found that neural organization and mental organization keep pace steadily step by step till, in the primitive cell of protoplasm, both nervous structure and mental function alike disappear.

The significance of these facts can scarcely be disputed, and the conclusion to which they point seems as clear as any scientific conclusion can be, short of actual proof which in this case is, by its very nature, unattainable. The verdict of modern science seems to be unmistakably in favour of a monistic interpretation of existence. If Reality be of a fundamentally dual or multiple character, why

should every line of analysis lead us steadily toward a closer and closer unification? If Matter and Mind be utterly disparate and independent existences why should they always appear in the most intimate relationship, and why should the two inter-related terms vary in strict concomitance as we trace them downward through the whole of organic nature to a state of ultimate simplicity which constitutes the limit of both?

And the facts seem to warrant an even more definite conclusion than the bare assertion of Monism would imply, for they seem to justify a belief not only that Reality is one and undivided, but that this one and undivided existence is psychophysical in nature—neither mental nor material as we understand these terms, but some absolute existence of which Mind and Matter are conceptual aspects. Direct evidence for the fundamental unity of Mind and Matter must of necessity be of a purely subjective kind. Every perception manifests a duality of aspect and implies a perceived object and a perceiving subject as its inseparable components. While Mind has to be regarded as an impression of Matter, Matter has no less to be regarded as an expression of Mind, and since a conception of either thus involves a conception of the other, the only solution of the riddle appears to be that both are functions of one reality in which these two conceptually disparate aspects are merged. This subjectively derived conclusion is supported by the objective evidence furnished along the evolutionary line of analysis just referred to. For here we see two related functions or modes of existence continuously approaching a common

limit, whence it is difficult to resist the inference that the two *modes of existence* ultimately merge into one absolute and *unmodified existence*. So we may amplify the statement already made by saying that the verdict of modern science not only seems to be in favour of a monistic interpretation of existence, but seems also to indicate that this unitary existence is psycho-physical in character.

So far our attention has been confined to the results reached by science up to the end of the last century, but the advance of science and of the philosophic speculations based on it have been so vast and so significant since then that "nineteenth century science" is coming to be regarded as almost out of date in certain directions. It is necessary, therefore, to carry our examination a stage farther, and to inquire whether the more recent developments of science tend to confirm or to contradict the conclusions to which the earlier scientific results have led. And such investigation is especially demanded in view of the fact that many of the results of nineteenth century science which were regarded as being among the most firmly established and unimpeachable truths have had to undergo radical modification or to be entirely abandoned. Among these are our conceptions of the constitution of matter and the manifestation of energy, Newton's laws of motion and gravitation, and our notions of space and time.

This inquiry we shall take up in the following section, and having briefly dealt with Mental and Material analysis, shall turn our attention to what may not inappropriately be termed Ultra-Material Analysis.

ULTRA-MATERIAL ANALYSIS

At the beginning of this century anyone who ventured to question the doctrine of the "indestructibility of matter" would have been regarded with as much astonishment as one who denied the rotundity of the earth or doubted the heliocentric arrangement of the solar system. Yet science to-day has become quite familiar with the notion of the "dematerialization of matter" and the "dissociation of the atom"; the "elements" are no longer regarded as elementary, and their supposed immutability has been conclusively disproved both in the laboratories of the chemists and the systems of the stars.

Nevertheless, familiar though the notion has become, not only to scientists but to ordinary educated persons, its profound significance for science and philosophy does not seem to have been fully realized, mainly perhaps through a misapprehension of its true meaning. The term "dissociation of the atom" is popularly supposed to mean merely its breaking up into smaller particles, just as a brick may be grated down into brickdust, and it is felt that there is nothing very profound or wonderful in such a simple process. But this is a complete misunderstanding of the facts. As Gustave le Bon says:—

"What becomes of matter when it dissociates? Can it be supposed that when

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atoms disintegrate they only divide into smaller parts, and thus form a simple dust of atoms? We shall see that nothing of the kind takes place, and that matter which dissociates dematerializes itself by passing through successive phases which gradually deprive it of its material qualities, until it finally returns to the imponderable ether whence it seems to have issued."

But, after all, the man in the street might well be excused for failing to grasp the doctrine that matter is nothing more than a form of energy—that the world-stuff, matter, which has ever been regarded as indissolubly associated with mass, inertia, and stability, is only a manifestation of something so elusive and fleeting as energy. A logical difficulty seems also to be involved in the idea, for the only conception we have hitherto been accustomed to form of kinetic energy is matter in motion; and if matter itself can be completely dissipated into energy, what is it that furnishes the vehicle for *that* energy? Kinetic energy implies movement, and movement implies something that moves—some substance. Thus, if matter disappears as energy, we are at once committed to the notion of an "immaterial substance", and this notion seems at first sight to be a contradiction in terms. We shall now inquire whether this seeming contradiction is a real one, and what sort of a notion, if any, can be formed of immaterial substance as the basis of energy.

Ordinary physical mass manifests itself as inertia, and is measured in our consciousness as resistance to movement. A heavy weight suspended by a

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string resists an effort to move it from its position of equilibrium, and the greater the mass the greater the resistance. All matter possesses mass, and the former is inconceivable apart from the latter. Is it equally true that mass cannot exist apart from matter? The modern physicist denies this, and declares that mass may and does exist apart from matter.

The following example, based on a simple principle in mechanics, may serve to elucidate this notion of mass as existing apart from matter.

Anyone who has held in his hand a heavy and rapidly rotating gyroscope, and has tried to move the whirling disc out of its plane of rotation, must have noticed the curious sensation of resistance to the hand's effort. This sensation is exactly the same as the resistance encountered when trying to push a hanging weight out of its position—that is, it is exactly the same as the sensation given by ordinary physical or material mass. Whence comes this resistance? It is obviously something other than the material mass of the gyroscope itself, for this resistance of the moving disc is not felt when the disc is at rest; and moreover the resistance is only exerted against an attempt to move it out of the plane of rotation, any movement in that plane meeting with no such resistance. It is evident, therefore, that this added resistance or kinetic inertia of the whirling disc, exactly simulating static inertia or mass, is in some way a function of the movement of the disc, and is dependent on that movement. Let us, therefore, call it “kinetic mass”, while the ordinary mass of the disc itself may be called its “inertial mass”.

We may now consider the energy generated by the rotational movement of the disc. Energy of rotational movement, like that of movement of translation, is measured by half the product of the mass and the square of the velocity ; but in this case the velocity is dependent on what is known as the radius of gyration, which, for any given solid of uniform density, bears a definite and constant relation to its geometrical radius. The energy of rotation is equal to that which would be generated if the whole mass of the body were situated at the extremity of the radius of gyration ; and were revolving round the axis of rotation with the linear velocity proper to that point. Thus the energy of our rotating disc can be expressed by mv^2 (where m represents the mass and v represents the velocity) multiplied by a coefficient which remains constant, and which can, for our present purpose, be left out of consideration so long as the dimensions of the disc remain constant.

It is evident that if v be increased by any multiple, and if, at the same time, m be reduced by the square of that multiple, the energy of the rotating disc will remain unchanged. For instance, if the rotational velocity be doubled, and the mass be reduced to one quarter, the energy of rotation will remain the same. Suppose, now, that such a reduction of mass and increase of velocity does take place. The energy would remain unaltered, and that resistance to movement out of the plane of rotation which we called the "kinetic mass" would, therefore, be as evident as before. Suppose a further diminution of density and increase of velocity to take place in the same relative proportions,

and successive similar changes to take place in a continuous series to an indefinite extent. What would be the outcome of such a process?

Since the process may theoretically be carried on without limit, it follows that while the kinetic mass would remain unchanged, the inertial mass could be made to reach a degree of tenuity exceeding any assignable degree of material diffusion, and the velocity of movement could be made to reach a value exceeding any assignable measure of velocity.

Seeing, then, that the decrease of substance on the one hand and the increase of movement on the other can be theoretically made to exceed any assigned limits, the question arises:—What is the ultimate condition in which inertial mass might be regarded as wholly annihilated and replaced by kinetic mass?

Before attempting to answer this question the relative nature of our conceptions must be emphasized. Substance and movement are not to be regarded as independent existents in their own right, but as conceptual aspects of some underlying Reality, while—as our illustration has suggested—“mass” is our perceptual experience of a relationship between them. These conceptual aspects would be better expressed in more abstract terms by conceiving the ultimate existents corresponding to substance and movement as a principle of inertia and a principle of activity. Thus, bearing in mind the relativity of our concepts, we shall be the better prepared for what seems to be the only possible answer to our question, viz. that the ultimate condition of existence is one in relation to which

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our concepts of substance and movement as independent existents must be abandoned, and we have to realize that *all mass is essentially kinetic mass*. Hence it would follow that while movement is inconceivable apart from substance, substance is itself a function of movement—a conclusion which presents a significant parallel to the one reached in the previous section when discussing the psycho-physical nature of perception, viz. that “While Mind has to be regarded as an impression of Matter, Matter has no less to be regarded as an expression of Mind.” And as in the former case so in the present one, there follows the further conclusion that the principle of inertia and the principle of activity being mutually interdependent, they must both be modes of one and the same real existence, where they would be merged as elements of a duality-in-unity perhaps of the same order as the “space-time continuum” of the Relativity theory.

It may be worth while to point out here that the unification of substance and movement is strongly suggested by the now familiar fact of ultra-material physics that the mass of a moving electron increases with its velocity. And the converse of this is illustrated by the still more recent conjecture of astro-physics that the substance of the stars is being constantly dissipated in the form of radiation.*

Thus it appears that an ultra-material analysis reveals the same process of unification as was disclosed by the mental and material analyses dealt with in the previous section, and not only so but that it carries on the process to a limit beyond which

* This subject is further discussed in a subsequent essay entitled *The Conceptual Limit*.

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human speculation cannot follow it. If such apparently disparate existences as substance and movement, hitherto regarded as the ultimate realities of the physical world, are by this further analysis found to approach a unification in some transcendental form of existence, the monistic theory of Reality, as far as it relates to the physical world, may be said to have attained as complete a proof as the limited nature of the human mind can demand. It remains to consider whether ultra-material analysis affords equal confirmation regarding the psycho-physical character of Reality which the earlier scientific results seemed to suggest.

The conception of the immaterial world to which these considerations have led us seems to imply a condition somewhat akin to what we call "potential energy". A condition in which substance and movement are merged together in one existence would probably embody in potential form the characteristics of both. So we might envisage it as a condition of strain or tension in which an inherent principle of movement or activity perpetually opposes an inherent principle of inertia. Perhaps the nearest approach we can make to a realization of such a condition is to regard it as partaking of the characters of both kinetic and potential energy but not identifiable with either—the same sort of shadowy picture, in fact, that we form of "space-time". That is to say, we have to regard it as a state of being in which the substance-element and the movement-element of conceptual energy are both potentially present as attributes or modes of one continuum.

Such a state of existence could never remain static. These two primordial principles would, so to speak, be in eternal conflict, and evolution of some kind would be necessitated by the very nature of the case. And since both principles must be of equal potency, being really one in essence, the mastery could not rest with either, and the resulting evolution would have a dual character. The substance-element would follow an integrative and stabilizing process leading toward the evolution of matter, while the movement-element would manifest itself in a tendency towards differentiation and instability culminating in the evolution of mind. These two processes must be regarded as taking place simultaneously and as being closely inter-related, since both arise out of one and the same ontological process.

Of proto-material evolution little can be said, in the present state of science, beyond the undoubted fact of its existence. Though the most advanced science of a few years ago had no conception of it, we have now more indubitable proof of its operation than we have of many evolutionary processes on the earth. For in much the same way as Galileo saw in the revolutions of Jupiter's satellites a proof of the Copernican theory, we can see proof of the process of proto-material evolution manifested among the stars. The spectra of the hottest stars show the presence of what are called the proto-elements, in which the atoms are supposed to have not yet attained a completely developed constitution, while stars which are less hot and more advanced in development begin to exhibit spectra of the elements as we know them under terrestrial conditions.

This observation is sufficient for our present purpose, so we may turn at once to a consideration of material evolution, with the atom—the fully “materialized” atom—as our starting point.

There is good ground for believing that atomic “valency”, that is, the number of combinations which an atom is capable of entering into with other atoms in the formation of molecules, is, to some extent, a measure of its instability. An atom which can combine with, say, three or four other atoms—what chemists call a tri-valent or tetra-valent atom—is, presumably, less stable than an atom which can combine with only one other atom—mono-valent. For chemical combination, probably, involves a certain disturbance of the intra-atomic equilibrium, and a greater facility for chemical combination, as manifested in a higher valency, would imply a greater readiness in the atomic equilibrium to yield to the disturbing influences of other atomic energies—that is, it would imply a less stable equilibrium. In the light of this connection between valency and instability, we shall find some clear indications that the progress of material evolution is a progress towards unstable equilibrium.

Stellar spectroscopy shows that the hottest stars are distinguished by the presence of hydrogen and helium, the former being a mono-valent element and the latter being devoid of any valency or chemical affinity whatever. It would hence follow that as the presence of these elements is characteristic of the hotter and more newly formed stars, the stabler forms of material equilibrium are the first to manifest themselves. And this is just what we should expect. As the various forms of proto-material

energy are passing into material energy, those forms which are less stable would be unfitted to maintain a permanent material equilibrium under those conditions of intense heat which are known to prevail in the earlier stars. These forms would, therefore, either fail to materialize at all under such conditions, or their feebleness equilibria would be soon destroyed, while those of greater stability would resist disruption and survive, by a sort of natural selection, as the first outstanding forms of matter properly so called. As the heat of the star diminished the less stable of the elements would be able to come into being. And this progressive evolution of matter would continue throughout the stellar history, the older stars showing the presence of elements of higher valency, such as carbon, which is a tetra-valent element, and which only appears in red stars which are supposed to be approaching extinction.

Passing from a consideration of atoms to that of their chemical combinations in molecules, it is obvious that these latter present less stable forms of equilibrium than do the atoms of which they are composed, and it may not be improbable that the varying equilibria of molecular combinations are closely related to the varying equilibria of the atoms. While chemical compounds present many degrees of stability, we find that the highest degree of instability, and the most mobile form of equilibrium in the inorganic world, are reached in the colloidal form of matter, which is now regarded as in some respects intermediate between the inorganic and the organic worlds. The essential feature of the colloids is that they consist of large unstable

molecules which unite with other molecules to form higher aggregates. The colloids, therefore, consist of a union of molecules forming compound molecules, and thus differ essentially from ordinary chemical compounds in which atoms unite to form simple molecules. And as atoms differ among themselves in their valencies and chemical affinities, so it has been found that the constituent molecules of a colloid differ in the numbers of unions which they can mutually form and in the intensities of these unions ; thus repeating, as it were on a higher plane, the principle of atomic valency and affinity.

In the living colloids of protoplasm, where carbon and nitrogen—both elements of high valency—play the leading part, the equilibrium becomes still more unstable. Indeed the instability here reaches, as it were, a breaking point, for the energies of living matter are held to consist essentially of a rhythmic breaking down and restoration (katabolism and anabolism) of the very unstable equilibria which it manifests.

Finally we reach the summit of instability in psychoplasm—nerve and brain matter—which, besides containing the carbohydrates and proteins essential to all protoplasm, contains as a further necessary ingredient of sentient protoplasm, another highly valent and unstable element, phosphorus. It is an interesting speculation as to whether the energy functions of psychoplasm, involving as they do such a high degree of instability, may not even implicate the intra-atomic energies themselves, leading to atomic dissociation. Might it possibly be that while non-sentient protoplasm functions by disruption of the molecule, sentient protoplasm,

reaching the final stage of katabolism, functions by disruption of the atom, and that consciousness is a form of radio-activity? Certain chemical reactions are now believed to give rise to atomic dissociation. Le Bon seems firmly to hold this view, and makes special mention of dissociation during the oxidization of phosphorus, which he describes as "one of the bodies with the most intense radio-activity". It seems to be another significant fact that nerve action is always found to be associated with electric discharge, while electric discharge is an invariable accompaniment of atomic dissociation.

Be this as it may, we have now reached a conception of evolution as interpretable in terms of equilibrium, and have found it to be characterized throughout its course by an increasing mobility and instability in this equilibrium. But something more than this is manifested in the cosmic process, for concomitantly with the progressive mobility and delicacy of adjustment of these energy equilibria there appear at certain salient points of the process new kinds of function—new "laws" not causally derivable from each other or interpretable in common terms—those laws which we call physical, chemical, vital, and mental. Thus we find that chemical compounds, while less stable than the atoms of which they are composed, manifest properties quite unlike in kind to those manifested by their component elements. The most unstable forms of inorganic compounds are the colloids, but this increased instability is not their only characteristic, for along with it they display certain remarkable functions which almost simulate those

of living matter. When we come to the protoplasm of living cells we not only find the condition of instability still more pronounced, but we find a whole set of new activities—nutrition, growth, reproduction, etc.—operating as functions of what we call Life. Finally in psychoplasm—the most unstable, mobile, and complex form assumed by matter as known to us—the living protoplasm becomes sentient, and there arises, in Mind, something utterly unprecedented, transcendently different in kind from all other known activities of the physical universe.

This marvellous process, beginning with the atom, attaining successively more disparate orders of function, and finally culminating in Thought, seems quite inexplicable on the theory that evolution arises out of one material existence alone. Ultra-material analysis gives, as already pointed out, some ground for the belief that the immaterial world is a condition of potential energy in which a principle of inertia and a principle of activity are merged in one undifferentiated existence. The progressive transformation of this potential energy into actual energy through that series of integrations and differentiations of matter and motion which we call evolution would imply an increasing liberation of the principle of activity, resulting in the manifestation of increasingly mobile and unstable forms of equilibrium. If this active principle were of a purely *physical* character—involving that conceptual notion of movement with which our analysis has so far been concerned—it would be reasonable to expect that the successive forms of equilibrium developed in the course of evolution, though

increasing in mobility, would exhibit a corresponding *physical* character throughout—they would be forms of energy-function involving laws of matter and motion alone, and wholly expressible in terms of such laws.

But, as already remarked, something more than this appears in the course of evolution, and this additional feature of the process demands explanation. The activities manifested are *not* physical only, but successively assume quite other and different qualities in the course of evolutionary advance. The only rational explanation of this remarkable fact would seem to be that the ontological principle of activity which we have found reason to postulate is not a principle of physical activity only, but contains potentialities of all the activities which the cosmic process exhibits.

Nor, indeed, is there any logical ground for restricting the notion of “activity” to the energies of matter-in-motion alone, since the term applies with equal fitness to chemical, vital and mental processes, and we have equal evidence that these kinds of activities do, as a matter of fact, exist. The reason for the priority given to the “mechanical” over the other forms of activity probably is that the physical laws governing the relationships of matter and force were from the first more amenable to ordinary methods of observation and calculation, and were therefore the first to be observed, studied and reduced to scientific order. They comprise the laws of motion and gravitation, of static and moving equilibria, of mechanical transformation and distribution of forces, and generally all those laws included under the term

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mechanics or physics. These laws, coming earliest under man's notice, confronting his observation at every turn, and exhibiting an apparent simplicity and a mathematical certitude which appealed to his intelligence, have unfortunately been raised to the supreme place in his scheme of the universe, and have even been accorded by Materialistic and Mechanistic systems a dominion over the realms of Life and Mind.

For the same reason the Law of Causation has been given a purely physical and mechanistic interpretation, for if the universe be nothing more than a vast machine all its workings must be of a mechanical order. But a truly Scientific Monism takes a deeper view. While acknowledging the operation of one supreme Law, it takes account of the various modes, beside the mechanical mode, in which this operation manifests itself, commencing with physical causation at the beginning of the process and culminating in psychic volition at its end. Thus interpreted, the process might be described, in accordance with our conception of the Psycho-Physical nature of Reality, as a Volitio-Causal process, and the term Directivity might be applied to the universal Law of the process, including both Causation and Volition. But this will be more conveniently discussed in a future section dealing with the philosophical implications of the subject.

To conclude, then, it appears that Ultra-material analysis, followed along the lines opened up by the most recent scientific research, not only confirms but reinforces the conclusions derived from the Mental and Material analyses of an earlier scientific

age. It has led us to a conception of Reality as a condition of infinite potentiality of energy in which activity and inertia—perceptually known as motion and matter, the two limiting existents of the earlier analysis—are, in some transcendent relationship like that of space and time, merged in one homogeneous and absolute unity. And it has suggested a conception of evolution whereby these immanent potentialities successively emerge into actualities through a dual but concomitant process of integration and differentiation, in which all the varied energy-functions which we call Laws of Nature are successively manifested at increasingly higher levels of complexity and instability. Such a conception of evolution enables us to see how certain great classes of laws appear at certain salient epochs of evolutionary history, and seem to be irreducible to lower terms and irresolvable into each other. These laws, which we call Physical, Chemical, Vital, and Mental, may thus be regarded as manifestations of one absolute existence in which Space and Time, Substance and Movement, Matter and Mind are eternally immanent.

GENERAL SYNTHESIS

IN the preceding sections we have dealt with proto-material and material evolution, in the consideration of which special attention has had to be given to the substance-movement aspect of Reality, observing that "we have to regard it as a state of being in which the substance element and the movement element of conceptual energy are both potentially present as attributes or modes of one continuum." We shall in the present section turn our attention to the more advanced stages of the evolutionary process manifested in vital, mental, and social evolution, and shall accordingly have to devote more particular consideration to the psychophysical aspect of Reality as playing the predominant part in that process. And having hitherto looked at the process as one of progressive integration and differentiation, we must now regard it in terms which involve a deeper conception and a more significant import.

Nineteenth century science had much to say about integration and differentiation, regarding these processes as giving a full account of the redistributions of matter and energy in the physical world. As typical of this view one calls to mind Herbert Spencer's famous definition of Evolution, in which all things were supposed to have been differentiated out of an "indefinite, incoherent homogeneity" and integrated into a "definite,

coherent heterogeneity"—somewhat as bricks are differentiated out of clay and integrated into walls. But no attempt seems to have been made to explain why the bricks, when built into walls, exhibited many new and surprising qualities and powers which they never exhibited as individual bricks. For no such explanation was possible when the bricks—the atoms—were regarded as completely finished products—or rather, not as products at all, but as being themselves the original and primordial elements of the world—eternal, indestructible and unchangeable.

Our present notion of the atom as something made up of more primitive elements, in a state of perpetual change, constantly giving out or absorbing energy, and susceptible even of complete annihilation suggests a very different picture and demands a very different interpretation of the physical world. And when, as Psycho-Physical Monism suggests, the very primal clay of which the bricks are composed may itself be of a double nature—(not a uniform existence but a duality-in-unity)—an interpretation, not only of the physical but also of the vital and mental worlds may possibly be in sight.

This new and revolutionary conception of the atom as a structural and functional aggregate makes it desirable to use some other terms than integration and differentiation to denote their inter-relations: terms of wider generality which would express more fully and deeply the relationships between aggregates of all kinds and the larger aggregates which they combine to form. The terms here suggested are Association and Co-operation, and their significance will appear in the following

propositions, for which our knowledge of physical and chemical laws seems to afford sufficient warrant.

- A. Every aggregate in stable equilibrium is a centre of potential energy, and any change to a state of less stable equilibrium is accompanied by a proportionate change of potential into kinetic energy.
- B. When two or more aggregates combine to form a compound aggregate the internal equilibrium of each component is modified in response to the combined influence of the others.
- C. This modification in the internal equilibrium of each component aggregate enables it to adapt itself to the new external equilibrium established between them all as members of the compound aggregate.
- D. When the transition from potential to kinetic energy is so profound as to implicate the ultimate substance-movement or psycho-physical nature of the component aggregates, new powers or functions are released and become manifest in the compound aggregate.

Proposition B describes the process which we propose to call Association, while Proposition C is a description of Co-operation, and it will be readily seen that these terms, thus understood, are sufficiently general to cover all orders of association in nature, including associations of atoms into molecules, of molecules into cells, of cells into organisms, and of organisms into societies. Proposition D gives a statement of the emergence of new "laws"—chemical, vital and mental—at certain stages of

evolution, and expresses it in terms of Psycho-Physical Monism.

It will be seen from Proposition A that the ruling feature of every aggregate, so far as concerns its powers of association and co-operation, is its degree of stability, and this accords with what has already been said in a previous section in the case of atomic aggregates; for it was there pointed out that there seems to be a definite connection between atomic valency and instability. We may now express this connection by saying that aggregates whose internal equilibria are the more easily modifiable by external influences are, by reason of that superior modifiability, the more capable of adapting themselves to the new equilibria established throughout the compound aggregates into which they enter, and are therefore the more capable of maintaining such associations in their integrity.

We shall now consider the bearings of this associative and co-operative principle on the evolutionary process, and for that purpose shall briefly review its principal stages.

The first step in the upward path toward vital and mental evolution is found in the colloidal compounds. These large and complex molecular aggregates are characterized by their ability to form comparatively mobile associations, and to maintain their associative integrity with more or less permanence in spite of their unstable condition—a characteristic which seems to be essential to the emergence of those new powers and functions which, later on, distinguish the activities of life and mind. In contrast with this we have those forms of association which can only maintain

themselves under conditions of greater stability, and hence display the static and inert qualities which belong to inorganic aggregates. The colloids, therefore, seem to stand at the parting of the ways which lead, on the one hand, toward life and mind, and on the other to purely physical evolution, and thus occupy a position intermediate between the inorganic and the organic worlds.

The next stage in the associative and co-operative process is seen in the formation of those molecular aggregates which constitute "living cells", with their new and unprecedented functions of nutrition, growth and reproduction. Next, in probably rapid succession (rapid, that is, on the evolutionary time scale) must have come the association of unicellular forms of life into colonies of such forms, and thereafter into multicellular forms, with their development of further new powers brought about by differentiations of structure and function into their various "systems"—digestive, reproductive, nervous, etc.

The two last-named functions demand some detailed notice. Asexual reproduction by fission may be regarded as merely a discontinuous form of growth, and involves no internal principle of variation; whereas sexual reproduction, based on the association and co-operation of opposite sexual elements, introduces this great principle into evolution as an intrinsic function of living matter operating in that duality-in-unity which is the fertilized ovum. That sexual reproduction is a source of variability, and perhaps the only source of heritable variability, has strong warrant in biological science, and hence we are justified in

taking a profounder view of these variations of the germplasm than did nineteenth century science, which was content to regard them as "fortuitous" and then to set them aside as requiring no further consideration. They may be more justly regarded as exhibiting a further step in the outcropping of new functions and laws resulting from the dual character of the psycho-physical Reality (Proposition D above). Thus regarded they no longer appear "fortuitous", but rather as causal elements in a definitely directive process.

The development of nervous systems introduces us to the highest plane of the psycho-physical process. We need do no more than mention how it is characterized structurally by the association and co-operation of nerve cells in nerve tracks and nerve groups; of simple primitive ganglia into large compound ganglia; and finally by the union of these into such wonderfully co-operative associations as the brains of the higher mammalia.

Following the parallel development of nervous function, we observe the growth of mind to be characterized by the same law of association and co-operation. Starting from a common root of unconscious sensitivity, it proceeds along the two branches broadly distinguished as the emotional and intellectual faculties. In the former we have reflex actions co-ordinating into instincts, instincts into emotional and conative impulses, and these finally into the full and unfettered exercise of volition. The intellectual development is similarly traceable through sensation, memory, perception, and cognition till it culminates in those highest mental levels at which, through the association

and co-operation of concrete perceptual presentations, there finally emerges the unique and crowning achievement of the psycho-physical process—the development of purely abstract thought.

The final stage in which we have to trace the process of association and co-operation (the one, indeed, to which those terms are often restricted) is social evolution. The association of individuals into societies begins, as is well known, among the lowest forms of sentient life, and reaches its fullest development among the highest, thus covering the entire field of mental evolution. And here, as throughout all lower levels, we find this universal process accompanied by a progressive insurgence of new powers and activities—attributes of social life—which would not otherwise have arisen.

Many observers of the social activities of bees, ants, and termites seem inclined to attribute to them a high degree of intelligence. Even though we may not fully agree with this opinion it seems fairly evident that these social insects must possess some form of mentality different from that of solitary species. Their constant association in large communities; their habits of intercommunion, and their marvellously co-operative activities inevitably suggest the development of some form of psychic function adapted to such conditions, and marking, perhaps, the highest level of mental advancement along the line of co-ordinated instincts and inherited habits.

Among the social mammalia we find definite evidence of association and co-operation producing mental developments of an intellectual order, such as concerted action in hunting, arrangements for defence, posting of sentries, mutual aid between

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individuals, and even instances of heroism and self-sacrifice. But, of course, it is among human societies that we find the principle of association and co-operation producing its highest results. At every stage of such association, through the family, the tribe, and the nation, the social conscience expands and deepens till, transcending its original form of mere hedonistic impulse, it attains the truly moral level in the abstract principles of Right, Duty, and Justice.

Thus throughout the whole course of evolution we have discerned the operation of one universal principle. The association of small and simple aggregates into larger and more complex aggregates involves, through some modification of their individuality by the smaller aggregates, a co-operation in the activities of the larger wholes. And the more facile and unrestrained is this modification the more harmonious and permanent becomes the co-operative integrity of the complex aggregates thus formed. This description, applicable to atoms and molecules in terms of their equilibria, is equally applicable to human beings in societies in terms of their social consciousness, and starting from its physical implications at the beginning of the psycho-physical process, can be carried on without break to its highest ethical implications at the end.

We have also found that at certain salient points of this process there become released from the infinite and eternal potentiality of the psycho-physical energy new functions, powers, and activities progressively leading up to what seems to be the final goal of the entire ontological process—the development, supremacy, and perfection of Mind.

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PSYCHO-PHYSICAL Monism lays no claim to novelty as a philosophic speculation, for even in its more recent developments it dates back as far as Bruno and Spinoza. All that has been attempted here is to find some reasoned justification for it in terms of modern science. But besides its scientific aspect its philosophical and ethical bearings are of great importance, and these must now be briefly considered.

As we have seen, the condition of instability inherent in the potential energy of substance by reason of its dual character impels it to an eternal process of development manifesting itself in a progressive series of associations and co-operations. It is this ontological process which underlies and actuates the visible cosmic process which we know as physical and mental evolution.

The inter-relations of the psycho-physical energy become increasingly heterogeneous, complex and definite as evolution progresses, till they finally reach that form of relationship manifested as consciousness. The whole course of evolution would thus appear to be a continuous progress toward the development and elaboration of Mind ; an emergence of higher and higher forms of consciousness in terms of more and more complex and definite inter-relations of the psycho-physical energy.

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This view seems to avoid the difficulties which beset Materialism on the one hand and Idealism on the other. Materialism, regarding matter as the sole reality and evolution as a purely physical and mechanical process, sees in Mind a merely accidental and unessential result of this process. The moral order is relative to consciousness only, and has no place whatever, potential or actual, in the cosmic order to which, on the contrary, it stands in opposition. Good and evil have no significance apart from human societies, and since human will is under the strict determinism of physical law, moral freedom, duty and responsibility are meaningless terms.

Pure Idealism, on the other hand, gives Mind—fully developed and intelligent Mind—the supreme place in the cosmic process, and interprets this process entirely in terms of such Mind, the whole phenomenal world being nothing more than a succession of mental images reflected, as it were, in each individual mind. But the Mind of which these mental images are the reflections is held to exist apart from individual minds—wherein philosophic Idealism differs from the fantastic absurdity called Solipsism—and this universal Mind is usually identified with Deity. Bishop Berkeley, for instance, regarded the objective world as a series of mental processes or thoughts in the mind of God. But this view, assuming as it does the infinite perfection of the Divine Mind, fails to account for the obvious logical and ethical imperfections of the thoughts of that Mind as manifested in the cosmic order.

In short, while Materialism fails to supply any real ground for moral Good, Idealism fails to

furnish any satisfactory explanation of moral Evil.

Psycho-Physical Monism does not postulate as the fundamental principle of existence either mind or matter as conceptually known, but regards Reality as a potentiality of both. Reality is held to be constituted of one psycho-physical substance, and evolution of one psycho-physical process, as the outcome of which the substance of mind and the substance of matter appear as two modes of this Reality—the two terms of that relation which is ultimately Consciousness. It must be noted that the word “substance” is here used in its purely philosophical sense, and is not meant to indicate anything material. “Matter” as commonly understood pertains, of course, entirely to the relationship, Consciousness, and not to either of its terms.

The universal, ontological world-process which we have termed Directivity (see end of Section II) is, and will probably ever remain in its essential nature utterly inscrutable to us, but it is reasonable to assume that it partakes of the dual character ascribed to Reality itself. If the substance of existence be psycho-physical its functioning must be presumed to be psycho-physical also, and must be regarded as containing within it both a psychic and a physical potentiality. Moreover, it is rational to conceive of this dual potentiality as the noumenal basis of the two phenomenal orders of function actually presented to us in consciousness, viz. Volition and Causation. We may then regard the energy functioning throughout Reality as a volitio-causal energy manifesting itself in consciousness in two separate aspects of activity respectively

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associated with the two separate aspects of existence known to us as Mind and Matter—the mental world functioning as a volitional order, and the physical world as a causal order. This conception may appear somewhat “metaphysical”, but it is really no more so than our common everyday conceptions of volition and causation themselves. We do not know, and probably never shall know what Will and Cause really are. They are both “metaphysical” conceptions utterly beyond our powers of cognition. If, then, we may daily speak of Will and Cause separately without being accused of talking irrationally, why should the notion of their relationship as two aspects of one fundamental—but not more incomprehensible—energy be stigmatized as irrational?

This view of the world-process introduces Freedom into the universe along with Law. Mechanical causation and volitional freedom find their places side by side in the potentiality of being; and as the physical process is a manifestation of the one, the intellectual and ethical process is a manifestation of the other.

And indeed, when we come to consider the matter closely, the gap between the two orders of activity does not seem so very wide. While causation may be regarded as the operation of an extrinsic energy, volition may be regarded as that of an intrinsic energy. The law of inertia states that a particle at rest must remain at rest, or a particle in motion must continue in motion unless acted on by some *external force*. Grant the particle, in the most infinitesimal degree, an *intrinsic* power of initiating or altering its own motion and we have

the germ of Will. In a universe entirely governed by physical law such a conception would, of course, be ruled out, but in a universe regarded as a manifestation of, not a physical only, but a psychophysical process the conception would not be quite unwarranted—indeed it would logically follow.

It seems worth while to allude here to one of the most recent results of atomic physics as affording some ground for belief that causation may not be the sole principle of activity in the ultra-material world. This is the remarkable conclusion now commonly entertained by physicists that the electrons which compose the atom, while revolving in their separate orbits round the central nucleus, also make apparently capricious “jumps” from one orbit to another, with the result that a certain “quantum” of energy is thereby liberated or absorbed according as the jumps take place from an outer to an inner orbit or the reverse. Though the existence of these sudden changes of orbit seems to be fairly well established they have, so far, received no explanation, and perhaps none is possible until the ultimate constitution of the electron itself is discovered—if such a discovery be ever accomplished. It may then be found that, as the electron differs fundamentally from what we know as matter it may be actuated by some energy-function differing fundamentally from what we know as causation. At any rate there is a curious significance in the fact that the one thing known to us in the physical universe as exhibiting other than purely physical attributes is also the one thing that seems to act otherwise than in conformity with causational law.

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THE hypothesis of Psycho-Physical Monism seems thus to lead up to the two following conclusions :—

- (1) The world process is not a system of purely physical forces operating under the physical law of causation toward no definite end, but is a system in which psychic energy operates throughout along with physical energy in a continuous and determinate direction toward the evolution of consciousness and the development of intelligence. The development of Mind and all its spiritual values, intellectual, moral and æsthetic is thus the final goal and natural climax of the world process as a whole. And since Mind is the goal of the process it follows that the process itself cannot logically be conceived as possessing any element of “design” or “purpose”, for purpose implies and presupposes Mind. The process has to be regarded as *directive*, but not *purposive*, though it may be that Causation is the physical aspect, while Purpose is the psychic aspect of one fundamental principle of Directivity—thus presenting in yet another mode that duality-in-unity which operates throughout the psycho-physical process.
- (2) The world-substance and the world-process, both being dual in character, each manifests

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itself in consciousness under a dual form, the one in the substance aspects of Mind and Matter, and the other in the energy aspects of Volition and Causation; Volition operating throughout the mental and Causation throughout the material aspect of Reality. Psycho-physical Monism thus admits the reality of Free Will equally with that of Causation.

It is necessary here to define with the utmost clearness the position of Psycho-Physical Monism in relation to the ancient controversy regarding Determinism and Free Will, and to this end it would be as well to set out the gist of the Determinist theory of moral responsibility as usually presented. According to this, a morally responsible being is one who possesses a moral sense capable of responding to moral influences such as praise or blame. But this moral sense is regarded as a merely passive capability of response, with no inherent activity of its own, though as such it is susceptible of being improved and strengthened according as the praise or blame it receives is bestowed with regard to good or bad conduct respectively. Thus praise and blame, so far as they have any bearing on responsibility, do not relate to past deeds (which were strictly determinate, and therefore could not have been avoided) but are entirely directed toward the modification of future conduct by virtue of their effect on the "responsible" moral character. Hence responsibility for wrong conduct is entirely denuded of that element of *culpability* which gives it all its moral significance, while blame and punishment are solely dictated by considerations of expediency in relation to the

future, and in no wise by considerations of justice in relation to the past. Now it must be stated with emphasis that no theory of responsibility which excludes the conceptions of culpability and of justice can lay any claim to be a moral theory. It might perhaps be described as a theory of the individual's reactivity to the social environment, but it cannot be regarded as a theory of moral responsibility in any real sense.

Determinism is supposed to be on its strongest ground in the sphere of moral choice and volition. It is contended that if choice be not determined by antecedent conditions, and if the will be not determined by a balance of motives, they must be uncaused, and negation of a cause is not only inconceivable, but excludes the conception of responsibility even more completely than Determinism is said to do. How can praise or blame be attached to actions which are uncaused and, so to speak, hanging in the air without support? If Determinism places responsibility on a false ground, Free Will seems to deprive it of all ground whatsoever.

The answer is that Free Will does not mean that volition is uncaused, but that its cause lies in the will itself. Freedom does not imply the absence of law, but the operation of a law inherent in its subject and not imposed from without. When, for instance, we speak of a "free country" we do not mean a country without laws, but one which is subject to laws of its own making and not to foreign domination.

This is obvious enough, but it involves an assumption of tremendous import. We must

assume that Causation is *not* the only law operating in the universe, but, restricting it to the physical world, we must admit that in the mental world there operates another law—equally primordial, equally absolute, but not a whit more inscrutable—namely, the law of Volition. Such a law would find its natural place in that conception of duality-in-unity furnished by the Psycho-Physical hypothesis. This hypothesis, in postulating volitional freedom, simply means that the will is governed, not by an alien rule—the law of physical causation—but by a rule arising from and belonging to its own intrinsic nature—a purely psychic law. This conception emancipates the will from that bondage of external coercion which Determinism would impose upon it, and justifies that irresistible sense of “freedom” which accompanies every volitional act.

A world-process directed toward the development of Mind and including in that development the operation of human Free Will assuredly possesses very definite ethical implications. All ethical systems may be broadly divided into two classes: those that seek (and generally succeed in finding to their own satisfaction) a real, objective principle of Good in the universe—absolute, unconditioned, and independent of man’s consciousness; and those that regard the Good as entirely relative to man as a conscious and social being, and consider that, apart from human societies, the universe, as far as we know, presents not the faintest suggestion of an ethical content, actual or potential. The hypothesis here discussed endorses neither of these systems, but accepts the element of truth underlying

both. On the one hand it rejects the conception of absolute Good existent in the universe (since Reality is not conceived as conscious) but postulates the existence of a potentiality of Good as involved in the world-process toward the emergence and development of Mind. On the other hand it agrees with the view that the Good, as actualized, is relative to man as a social being, but gives it a cosmic significance by basing it on conformity with the world-process and evaluating it by the standard set by that process, viz. progress toward and attainment of the highest intellectual, moral, and æsthetic attributes of Mind. Hence the definition of the highest Good in this ethical system would be :—The attainment of the fullest possible welfare of humanity in accordance with the fullest possible development of Mind as manifested in man's intellectual, moral, and æsthetic nature. The conception of the Good as relative to humanity is thus made subject to the conception of the real and absolute mental development exhibited by the world-process. The relative utilitarian formula does not furnish the supreme standard of morals, as its original formulators claimed, but is subordinated to a further standard of absolute validity as its condition and criterion.

Two possible criticisms must here be considered. It may be asked, how does this ethical theory meet the everlasting problem of Evil? Does the development of Mind, to whatever spiritual heights it may attain, justify all the cruelty of "Nature red in tooth and claw" involved in the process? But there is no moral evil where there is no moral consciousness. The world process underlying the

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visible cosmic process is not credited with consciousness, and thus incurs no moral responsibility. In fact, the ethical problem of Evil only arises when the world process is supposed to be directed by a conscious moral being. Otherwise it is non-existent ; and no moral judgment can be logically applied to an unintelligent world-process out of which the very capacity for moral judgment itself arises.

Again, it may be objected that the development of Mind need not in itself be necessarily a good. This development is not, as such, a moral power, for it is as capable of bringing about evil as it is of achieving good. This may be freely admitted. It is not claimed that the world-process is in itself either good or evil, but only that, in the development of Mind which characterizes it an ethical potentiality is to be found. It is for us, as free and conscious agents, to direct that potentiality to good ends rather than to evil ones. It is, indeed, this very condition that gives us the true status of moral beings. An automatic development of Mind towards Good independently of our own efforts would deprive our freedom of all its moral content, and make us mere puppets of the cosmic process as completely as would the mechanistic universe of Materialism. A freedom which is useless and superfluous would be morally little better than a rigid determinism. To complain that the world-process, in bringing about the conditions which make moral values possible, have also brought about the possibility of disvalue, is as unreasonable as it would be for a man, given a field of rich and fertile soil for his cultivation, to complain that it is

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as fertile for the production of weeds as of corn. It is for him to see that it produces corn rather than weeds.

CONCLUSION

Thus Psycho-Physical Monism postulates a world-process which, though itself unmoral, contains immanent within it the potencies of a moral order and of free moral choice. The ontological basis of this moral order is furnished by that universal principle of Association and Co-operation which we have found manifesting itself throughout evolution from atomic structures to human societies, and which, realizing itself in moral consciousness, continues to point the way along the upward path ; while with us remains the choice whether we follow this path or deviate from it. Hence we see that the philosophic theory here discussed furnishes a fixed moral standard accompanied by free moral choice, which are the two necessary and sufficient conditions of a truly moral system. A system moreover which, based on scientific grounds, is capable of affording to mankind a surer inspiration and a firmer hope than one based on theological assumptions. No longer need we regard Mind as nothing more than an unessential and transient product of a purely mechanistic process, or, as Sir J. Jeans suggests in *The Universe Around Us*, a mere by-product derived from "the inert atoms which form our earth . . . a sort of final ash resulting from the combustion of the universe."

Psycho-Physical Monism gives us a different sort of outlook. The psychic principle whence Mind develops is here regarded as a primal and

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basic element of existence, co-equal and co-eternal with the physical principle whence issues Matter, and we ourselves are the culminating product of their mutual co-operation. Man is, therefore, no alien stranger or chance intruder in the universe, but a rightful citizen of this majestic realm, the heir and trustee of all its spiritual potentialities, in whom they are becoming slowly but surely actualized, and through whom they may yet be destined to attain unimagined heights.

II

EVOLUTION AS A PSYCHO-PHYSICAL PROCESS

- (1) Psycho-Physical Monism envisages Real Existence as a Unity embracing the opposite and complementary principles of Activity and Inertia, immanent in one homogeneous continuum. This Unity is so close and absolute that it admits of no conceivable relationship of any kind between its two elements. The Existence is unconditioned and unrelational.
- (2) An infinite and homogeneous existence involving opposite principles would imply instability. And this inherent instability would involve differentiation into definite centres of Inertia and definite fields of Activity, the mutual relations of which would constitute the " laws " of force and energy.
- (3) These centres of Force and fields of Energy would form aggregates or systems varying according to the intensities of their inertial and kinetic components. These dual systems, now known as systems of protons and electrons, would form the first " material atoms ", and the variations just alluded to would furnish the basis of variations in atomic stability and chemical affinity.
- (4) A further stage of integration would follow in the form of chemical combinations, the primary

kinetic-inertial aggregates uniting with others to form compound aggregates with resultant transformations and readjustments of their energy equilibria.

- (5) These transformations in the equilibria of the primary aggregates would have the effect of releasing their kinetic energy in response to the primordial tendency toward differentiation. A new orientation of forces would thus arise. The kinetic components of each primary system would tend to form a new kind of inter-relationship among themselves, and these kinetic inter-relations would, as a distinctive system, form relationships, also of a new order, with the primary kinetic-inertial system. That is to say, the mixed relationship among kinetic-inertial aggregates would have super-posed upon them a purer and more clear cut relationship between predominantly kinetic systems on the one hand and mixed kinetic-inertial systems on the other; and new laws and functions would thereby manifest themselves. We should see, in short, the appearance of what we call "chemical laws". This change would signify the inception of something entirely new in nature and no such fundamental transformation would be explicable unless we postulate a *potential duality* in the nature of Real Existence.
- (6) Higher stages of transformation would follow. The compound (molecular) aggregates would combine to form aggregates with each other, giving rise to further differentiation of the kinetic components and more clearly defined

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relationships. The new functions thus arising would manifest themselves in what we call "vital laws".

- (7) The process continuing (always under the persistent urge toward differentiation inherent in the primordial duality and instability) would finally reach its culmination in a complete differentiation of original kinetic-inertial relationships into two groups of purely kinetic and of mixed relationships respectively. And the super relationship between these groups would, by virtue of this clear-cut and definite separation of its terms, manifest a unique quality hitherto unattained, though continuously approached. This relationship would be known to us as Consciousness, or the Perceptual Relationship.

It will be observed that this summary account of the evolutionary process regards it as a progressive development of *relationships* between two complementary modes of existence. From a condition in which the primordial Unity binding these two modes of existence precludes any conceivable relationship between them (see Paragraph 1) the process follows a continuous series of differentiations, ending in relationships of the purest form in which the terms present a complete Duality.

Now it is obvious that the nature of the two terms which reciprocally enter into this series of progressive relationships would be most truly manifested when the relationship reaches its clearest and most perfectly defined form. And hence, as the perceptual Relationship does undoubtedly reveal its terms under the two clear concepts of Mind

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Perceiving and Matter Perceived, we seem justified in postulating Reality as Psycho-Physical. Thus the two modes of existence hitherto called a Principle of Activity and a Principle of Inertia would be more truly described as a Psychic Principle and a Physical Principle, or more simply as Spirit and Matter.

III

PURPOSE

THE conception of a psychic principle operating throughout the cosmic process throws light on many philosophic questions, including that of Design or Purpose in the universe. Materialism, maintaining that the world process, including the evolution of Mind, is entirely the product of physical forces, can find no place for purposive activity until conscious Will is reached; though even here, seeing that Will is held to be nothing more than a strictly determinate product of these physical forces, the admission of Purpose does not seem to be quite logical. How can purposive activity ever arise out of a mechanistic system of purely physical functions from which the notion of Purpose is necessarily excluded?

But if the universe is the outcome of a process in which a psychic principle has been at work from the beginning the case seems very different. We then see it as a vast process of association and co-operation between two orders of existence—a process ever working toward a differentiation of these two orders, and thus *directed toward a definite end, the development and perfection of Mind*. This directive activity, operating at every step of the process, is, as we have suggested, a principle of *psychic activity* operating in relationship with a physical principle of inertia, and thus we should not, like the Materialist, be making an illegitimate assumption in ascribing to it the psychic attribute of Purpose. Hence we might call this directive

activity Unconscious Purpose, and tracing it up through the process of differentiation which ends in the appearance of Mind, we may see its final outcome as Conscious Purpose or Will on the one hand and purely physical directivity or Causation on the other.

Is it possible to bridge the gap between Directivity and Purpose, and thus find ground for assuming their fundamental community of nature? Such a possibility, if it exists, should obviously be sought among the functions of primitive nervous systems. The simplest form of nervous system is a nerve-track between two nerve-centres, say *A* and *B*, conveying a stimulus from the centre *A* which arouses a response in the form of a nervous discharge in the centre *B*. This may be described as a causal sequence passing from the activity of *A* as cause to the activity of *B* as effect. In the case of physical causation the process takes place in one direction only, and is irreversible. The causal impulse passes from *A* to *B* and there it ends. But may it not be that psycho-physical directivity implies something more than this? May it not be that the effect produced in *B* acts in turn as a reciprocating cause on *A* and produces, like an echo of the original impulse, some faint modification in its source? If so we can envisage, along with the gradual development of the nerve-track between *A* and *B* (in the way suggested by Herbert Spencer in the chapter on the Genesis of Simple Nervous Systems in his *Principles of Psychology*) the gradual formation of a supplementary nervous structure in close association with *A*, say *A*₁, capable of registering the changes induced by *A* in *B*. When this

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supplementary centre becomes fully established, its stimulation, induced or spontaneous, may be capable of arousing the activity of *A*, and thus causing it to send its habitual stimulus to *B*. When Consciousness supervenes the activity of *A* would take the form of an *image or idea* of the change in *B*, and the subsequent occurrence of that change would appear as the accomplishment of an act of Will or Purpose. This accords with the well known psychological fact that an act of Will is always preceded by an idea of the thing willed.

It may be urged that the foregoing suggestion is of a purely "mechanistic" kind, but this is not so. The principle of reciprocal causation invoked is not a physical principle but a psycho-physical one, being in fact a manifestation of that power of active response characteristic of living matter. This it is that generates the co-operative unity which distinguishes the functions of Life and Mind from those of the inorganic world.

IV

THE CONCEPTUAL LIMIT

AMONG the very remarkable developments of modern physical science perhaps the most significant is the discovery that the mass of a moving particle increases with its velocity, this increase corresponding to what we have called "kinetic mass". As no limit is assigned to the validity of this relationship between mass and motion we are logically justified in assuming that it holds for all degrees of mass, however small, and for all degrees of velocity, however great; and we are tempted to speculate as to what condition of energy—as a function of mass and velocity—would exist when the mass becomes smaller and the velocity becomes greater than any assignable limit. These would be the same as the mathematical "limits" with which the infinitesimal calculus concerns itself, and would presumably lead to analogous results, giving as the final form of the relationship the expression $0 \times \infty$, which is, of course, mathematically meaningless.

But this mental impasse is nothing new, for the difficulty has confronted mathematicians ever since the calculus was invented. The Differential Calculus is the method of finding the derivatives of various functions—the derivative being the rate of change of one variable (the dependent variable) with respect to the concomitant change in the other—the independent variable. Each of these variables is regarded as changing by infinitesimally small steps called differentials, and thus the rate of change at

any point can be expressed as the ratio between these differentials. The independent variable is usually denoted by x , the dependent variable by y , and their minute changes by dx and dy respectively. The "function" is the mathematical relationship between y and x , and the derivative of the function, or rate of change, at any given value of x is expressed by the ratio $\frac{dy}{dx}$. But it is here that the difficulty arises. How can we suppose a rate of change to exist *at* a given point, when *at* that point there could be no change at all? *At* any point dx , and consequently dy , would both be zero, and the ratio $\frac{dy}{dx}$ would be $\frac{0}{0}$ which, like the expression $0 \times \infty$, is held to be quite meaningless.

The difficulty is supposed to be got over by avoiding the expression "rate of change at a given point" and substituting for it the expression "average rate of change over an indefinitely small interval about a given point". And dx and dy have consequently to be regarded as quantities which can be made to approach the limit zero within any degree of approximation however small, but must not be regarded as ever *reaching* zero.

But it is difficult to accept this solution. The derivative of any function is supposed to have—and undoubtedly does have—a perfectly definite value at some perfectly definite point, and since the accuracy of the "average rate of change" increases concomitantly with the smallness of the interval, and becomes complete only when the interval vanishes, it seems impossible to avoid the conclusion

that the definite value of the derivative can only be reached when dx and dy *actually reach* the limiting value zero.

Leibnitz, the co-inventor with Newton of the Differential Calculus, avoided this dilemma by postulating the existence of infinitesimals, or "infinitely small" quantities, but this has been condemned by modern mathematicians as savouring of "bad philosophy" (Whitehead, *Introduction to Mathematics*, p. 227). Anyhow, this derogatory verdict suggests that the question may be more fruitfully discussed in philosophical than in mathematical terms. And to this end we might begin by asking what we really mean by a "limit." Are these mathematical "limits" zero and infinity objectively existent, or are they merely products of conceptual thought?

An example from physical science may be helpful here. As is well known, the visible solar spectrum represents but a small fraction of the total range of ether vibrations, or whatever it may be that we call radiation. Beyond the violet rays at one end and the red rays at the other lie extensive ranges of invisible rays which the limited nature of our visual sensibility prevents us from seeing. Were it not that we possess other means of detecting these rays we should be totally ignorant of their existence. That is to say, our limited power of perceiving light vibrations imposes a *perceptual limit* to our knowledge of the spectrum.

It is reasonable to suppose that a similar limitation must apply to conceptual thought. Mind being a product or function of Reality, the activity which constitutes it must be limited, and this condition

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must impose on the operations of the intellect a *conceptual limit* analogous to the perceptual limits which we encounter in the world of experience. But there is this difference, that whereas physical science enables us to translate our perceptions into concepts of matter and motion as existing in the objective world—e.g. sensations of light into vibrations of ether—there exists nothing more fundamental into which our cognitions can be translated. There is therefore an absoluteness and finality in the conceptual limit which cannot be transcended, and the notion of any existence beyond it would be inconceivable.

If this be true, the implications are fairly obvious. The mathematical limits zero and infinity with which the infinitesimal calculus deals are not absolute limits, but merely the subjective boundaries of our intellectual faculty. The “infinitely small” quantities of Leibnitz may really exist, and dx and dy may be truly regarded as reaching the limit zero while still remaining amenable to mathematical operations. And $\frac{dy}{dx}$ at limit zero would be “meaningless” only in the sense that its meaning would transcend our comprehension.

We may now return to the consideration of the moving particle with its energy at the limit $0 \times \infty$. This would now mean “an infinitely small mass moving with infinitely great velocity”. The only concept we can form of this condition is that of a complete dematerialization of mass, and of a state of Being involving an infinite, structureless continuity in which all discrete existence has disappeared. And since motion is dependent on mass, the

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movement would undergo a like transformation and assume a corresponding condition of universal diffusion and continuity, becoming, as it were, immanent within the continuous immaterial substance. This would be the state of Being previously envisaged, as a Principle of Activity and a Principle of Inertia forming the Duality in Unity of Real Existence.

From this final result of analysis our synthesis would have to start. The inherent instability of this dual substance would involve differentiation, and this would probably begin with the formation of condensations or “waves” in the continuum, and such condensations would be the first stages of material structure. Out of the formless, universal *subsistent* order of Being would begin to arise those structured, discrete, and particulate *ex-istents* which constitute the “physical world”.

The most recent development in physics—the so-called “wave-theory” of the atom—seems to afford a remarkable degree of support to the foregoing speculations, as will be seen by the following quotation from Mr. C. E. M. Joad’s *Guide to Modern Thought*, p. 85 :—

“In the latest developments of atomic theory—those of Heisenberg and Schrodinger—the ‘solar system’ conception has been given up. There has for long been difficulty in determining whether the atom should be conceived as a small bullet or projectile, or as a system of waves. Some phenomena have seemed to require the former conception; others have been compatible only with the

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latter. . . . But the demands of the phenomena which seem to require a wave-motion at the basis of matter have recently reasserted themselves, and the latest conception transcends the limits of the pictorial imagination by postulating a projectile with wave-like properties and a wave with projectile-like properties."

Can it be that modern science is reaching the utmost limits of our conceptual range, and is being confronted with that mysterious Duality in Unity which underlies the world of our experience?

V

FACTORS OF MORAL RESPONSIBILITY

LAW

IN the article "Scientific Monism" (Section III, "General Synthesis") an attempt was made to show that the entire Psycho-Physical process was subject to the operation of one universal law. The working of this law was briefly traced from the association of atoms into molecular and compound molecular aggregates; through the association of these colloidal molecules to form living cells; the aggregation of these unicellular forms of life into groups or colonies and their ultimate closer organization in definite multicellular organisms; and finally the association, in certain species of individuals, into social groups, exemplified in order of advance by the family, the herd, the clan, the tribe and the nation.

This law can be stated as follows :—

- (1) All individual forms of existence tend towards mutual association, and all aggregates thus formed tend to associate themselves into compound aggregates of a higher order.
- (2) Aggregates associating themselves into those of higher orders become modified in adaptation to the relationships prevailing in the super-aggregates, and hence exhibit qualities which were not exhibited in their unassociated condition.

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These two simple conceptions, supported by evidence furnished throughout the whole range of evolution, thus embody a law of the cosmic process which might be called the Psycho-Physical Law, since it is the active principle of those Psycho-Physical differentiations which characterize that process and culminate in the development of Mind. Having glanced at the general operation of the law we shall now briefly consider its agency in relation to the human individual.

Every human being is a product of the union of two cells which are themselves highly complex aggregates of living elements. This association gives rise to co-operations of the most amazing kinds—differentiations and integrations of structure and function which seem to proceed under the influence of a definite, though unconscious Purpose. Here also are initiated those modifications of the germinal elements called “variations” which are destined to affect the structures or functions of the developed individual.

With the newly born individual Consciousness arises, and with the dawn of Consciousness the individual becomes aware of its co-operative association with a higher aggregate—the Family. Within this association is generated what might be called the Family Ethic. Here arise the earliest Social instincts, the most primitive social sentiments—parental and filial affections, sympathies and antipathies, loves and hates; the products of concrete experiences furnished by associations among individuals in direct social contact. The Family Ethic is predominantly emotional, and had the Family remained an isolated unit, as it probably

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was in the early stages of human evolution, morals would not have risen above this level.

But the Family is now, even amongst the lowest savages, a unit of a higher aggregate, a community of Families ; and along with the Family Ethic, and closely associated with it, there develops a higher Social Ethic based on abstract moral principle and not on concrete emotional experience. Here the concept of personal rights expands by abstraction into the concept of general, impersonal Right and its necessary complement, the equally general concept of Duty ; while Right and Duty give rise to the highest concept of all, that of Justice. And they all arise through that higher order of association and co-operation in which the Family is merged. The emotional, hedonistic ethic of the Family has been supplemented by a truly Moral Law—the final consummation of that Psycho-Physical Law which has operated throughout the cosmic process.

FREEDOM

In the article already cited (Section V, “The Ethical Aspect”) it was pointed out that Psycho-Physical Monism, postulating the fundamental existence of a Duality in Unity, is logically committed to the belief in a duality of Law—the Law of Causation operating in the physical world and the Law of Volition operating in the mental world. It was also pointed out that Freedom does not, as is often mistakenly supposed, imply absence of Law, but conformity with a Law inherent or arising from the intrinsic nature of that mode of existence which manifests it. And since our theory maintains

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that the psychic mode of existence manifests a Law proper to itself, obedience to that Law is correctly held to be Freedom.

But now it may be asked, What *is* this Law of Volition which has been so often mentioned? Perhaps the best way to attempt some answer to this question will be to contrast it with its opposite, the Law of Causation, and this contrast will be most clearly shown by reducing both concepts to their lowest expressions in terms of Substance and Movement.

The Law of Causation is based on the principle that any change in the energy of a moving particle is the result of some external energy. This is, in effect, a statement of Newton's First Law of Motion, and expresses the Principle of Inertia. The relationship between the external force and the energy change it produces is Causation. The Law of Volition is based on the principle that any change in the inherent activity of immaterial substance arises out of this activity itself. It is self-induced, and the relationship between the inherent activity and its self-induced change is Volition.

It may be objected that this is merely a statement in "metaphysical" terms and is no real explanation at all. But exactly the same can be said of Causation. The externally produced changes which underlie Causation are just as inexplicable as the internally induced changes which underlie Volition. The most we can do is, not to explain their real nature, but to adduce grounds for belief in their real existence, for the real nature of each lies beyond the conceptual limit and thus transcends our comprehension.

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RESPONSIBILITY

That such seemingly opposite notions as Law and Freedom should be regarded as factors of Moral Responsibility might appear at first sight as somewhat of a paradox, but a little reflection ought to convince us of its truth. A Will that is completely and absolutely unguided, owning no allegiance to and possessing no awareness of any directing principle, would be completely devoid of Moral Responsibility. A person actuated by such a Will could justly say, "If I am free to will as I choose, and my Will is not guided by any Moral Law, there is no reason why I should be charged with Moral Responsibility. There is nothing for me to be responsible to." This is, in fact, one of the chief determinist arguments against the Free Will doctrine as usually stated, and it is a perfectly valid one.

On the other hand, the existence of a Law along with the absence of Freedom in relation to that Law would, of course, be equally incompatible with Responsibility in regard to its behests. It is this incompatibility that deprives Determinism of any real claim to be a theory of *moral* responsibility, and forces it to express its claim in hedonistic terms, wherein Responsibility becomes nothing more than the individual's reactivity to the social welfare. True Moral Responsibility bears no immediate relation to social welfare. It is not directed toward society, but to the Moral Law within the individual's own intuitive cognition—commonly called his Conscience—whose authority is derived from its origin in Reality and its development throughout the whole course of evolution.

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Hence Moral Responsibility may be defined as the product of, on the one hand a consciousness of Volitional Freedom, and on the other a consciousness of an instinctive impulse or urge prompting to the exercise of this freedom in a definite direction, and inhibiting its exercise in the opposite direction ; whereby the former is intuitively felt to be Right and the latter to be Wrong.

VI

SOCIAL WELFARE

As is well known there are two elements involved in moral conduct, an internal moral sanction prompting us to do the Right and to refrain from doing Wrong, and an external moral standard by which we determine what *is* Right and what *is* Wrong. Having in the preceding article discussed the former, we shall now consider the latter.

Utilitarianism, or as it is more appropriately named, the Greatest Happiness Principle, has been criticized on two main grounds. In the first place it has been urged that a standard of morals cannot be logically or securely based on such a shifting and variable foundation as "happiness", when it is a fact of daily observation that scarcely two human beings' ideas of what constitutes happiness are precisely the same. It is rather like basing an ultimate standard of dietetics on individual preferences in the matter of food, regardless of the fact that "what is one man's meat is another man's poison". The second criticism is that, even were all men's ideas of happiness perfectly uniform, the moral criterion should have a deeper and surer foundation than is furnished by human feelings. It expresses the conviction that our moral intentions have an absolute and real basis, and are not merely relative to human experience. The first of these two criticisms will form the subject of a later article, so our attention may for the present be confined to the second.

The question of the reality or otherwise of man's spiritual "values" has been a subject of controversy throughout the whole course of philosophic thought, but has shown a distinct revival of late years. The materialist philosopher is, of course, compelled to deny any such reality. To him all mental processes, from the most primitive sensations to the highest activities of the intellect, are merely functions of "matter", and it would be absurd to attribute to matter—in his view the only real existent—any sort of moral or other psychic quality. Most philosophers of other persuasions seem inclined toward a belief in the reality of moral and other values, but their expositions as to whereof these values consist and how they are to be envisaged as existing are regrettably obscure. The theistic philosophers—and philosophic theists—can, however, tell us something more definite, asserting that these values are ideas existing in the mind of God. But unfortunately this begs the question.

Confining ourselves to a consideration of moral values only, the problem, when freed from all its philosophic obscurities, seems to be reducible to three plain and simple questions:—

- (1) Does a definite moral standard of conduct exist?
- (2) If it exists does it possess an absolute existence, or does it exist relatively to human experience?
- (3) If it has an absolute existence, to what order of being can it be assigned?

To the first question experience itself gives an unequivocal reply. All men feel that a definite standard or rule of moral conduct exists, whether

it be followed or not. There is an ever-present conviction of the antithesis between Right and Wrong—that conduct possesses moral value.

The answer to the second question, though not a direct datum of experience, is a logical inference from it. The concept of an absolute Rule or Law governing our world of emotional experience cannot be the product of something which is itself merely relative to that experience. It must have a deeper origin and an independent status, since it is derived from a process of Abstraction, and Abstraction is the apprehension of a subsistent and universal psychic principle independent of its concrete manifestations.

And this includes the answer to the third question, for the order of being to which moral value must be assigned can be no other than that psychic principle of Reality which, according to Psycho-Physical Monism, constitutes, with the physical principle, the dual order of existence. So we finally reach the conclusion that Moral Value is that potentiality immanent in Real Existence which attains actuality in consciousness as our concept of Right and Wrong.

Having reached this conception of Moral Value as an eternal, absolute, and spiritual element of Reality we must now turn to a consideration of its concrete aspect—its manifestation in experience as an external standard of moral conduct.

This practical aspect of Moral Value we propose to term Social Welfare, but as this rather trite and hackneyed expression, like many another such, is generally used in a very loose and undefined way, it will be necessary at the outset to define the word

“welfare” with some precision. For the purpose of this discussion, then, we shall define welfare as :— That condition of corporate integrity in the existence of any aggregate which is attained by the fullest natural co-operation of all its associated units.

As the word “natural” is of some importance in this connection it demands some detailed explanation as here used. By “natural co-operation” is meant that form or order of co-operation proper to the nature of the units manifesting it, and which is therefore limited in its scope and quality by that inherent nature. Thus the co-operation of the atoms in a molecular aggregate would be of a comparatively simple nature—that kind of co-operation which we call chemical combination. The co-operation of living cells in a vegetal or animal organism would be of a far different character—and of a higher order in the latter than in the former—corresponding to the vast difference between the nature of living cells and that of atoms. The co-operation of individual animals in social groups would be of a still higher order, and would accord with progressive changes in the nature of their units. In human societies the co-operation would be largely governed by the mental characteristics or nature of the units (the individuals) engaged in it, according to the advance of the social aggregates from savagery to civilization. Finally, in the fully civilized society, the character of the individual would attain its highest level and the co-operation would manifest *all* the qualities—physical, moral, intellectual and æsthetic—so far attained by human “nature”. The co-operative association would now be a predominantly spiritual

one, though individuals would differ vastly in their natural capacities for entering into the higher forms of it. This final and highest order of welfare we may then call Social Welfare, and thus we may regard Social Welfare as furnishing the concrete aspect of Moral Value and affording the practical criterion of moral conduct.

This criterion should enable us to answer the question, not as to what quantity of happiness is greater, but as to what *quality* of happiness is the *better* in any given case of comparison—say between the kind of happiness preferred by the drunkard or the sensualist and that preferred by the philosopher, the scientist, or the poet. The reply would be:—That kind of happiness is the better which is the more compatible with Social Welfare: which means in terms of our definition, more in harmony with the association and co-operation of men in all their natural human relations—not physical only, but physical, moral, intellectual and æsthetic. Or, expressed more simply if less precisely:—The spiritual kind of happiness is better than the material kind.

This seems to the normal mind so obvious as to be almost axiomatic. Even the sensualist cannot help vaguely feeling that, though the pleasures of the senses are the only form of happiness for *him*, the other kinds of happiness are in some way “higher” than his.

In this article an attempt has been made to justify the axiomatic character of the moral standard by relating it to first principles.

VII

JUSTICE

THE idea of Justice occupies a supreme and paramount position among our moral concepts. It possesses an *a priori* and axiomatic quality equal to that manifested by our intellectual intuitions and the "necessary truths" of mathematical reasoning. It is fundamental in its nature, universal in its range, and predominant in its moral authority.

To exhibit the fundamental and basic character of the concept of Justice we may compare it with some simple truth of geometry. It is as true that the social rights and duties of all members of a community are identical as it is true that the geometrical properties of all triangles are identical, for as the geometrical properties belong to the intrinsic nature of triangles, so does the relationship of rights and duties—which is Justice—belong to the intrinsic nature of social membership.

Justice is also universal in its range, since it is completely independent of personal considerations. Charity has to take account of individual desert. Statements of truth have often to take account of human weakness and human wickedness. But the holiest of saints and the vilest of sinners come alike within the ambit of Justice.

And Justice is supreme in authority over all the other moral sanctions. It is commonly held that Justice should in some circumstances yield its supremacy to Mercy, but it is forgotten that in all such cases the Mercy which tempers Justice is

tacitly assumed to be *deserved*, and that hence such exercise of mercy is, in a deeper sense, itself an act of justice. Portia's famous address to Shylock owes nearly all its force to the fact that the Jew's claim is fundamentally *unjust*. If Antonio had deliberately swindled Shylock of his ducats, and stood in danger, not of forfeiting a pound of his flesh, but of undergoing a just and reasonable term of penal servitude, Portia's plea for mercy would probably have been less eloquent and moving.

In the case of Justice, then, if anywhere, should philosophy find that absolute and unconditional basis in Reality which all moral values demand as their foundation.

In the essay entitled "Factors of Moral Responsibility" was given a formula of the Psycho-Physical process, the second part of which ran as follows:—

"Aggregates associating themselves into those of higher orders become modified in adaptation to the relationships prevailing in the super-aggregates, and hence exhibit qualities which were not exhibited in their unassociated condition."

This relationship between the simple aggregates and the compound ones into which they enter may be expressed in terms of equilibrium. We may regard the modification of the simple aggregate as a change in its internal equilibrium brought about by the influence of the compound aggregate of which it is a unit, and directed toward the maintenance of the equilibrium of this compound aggregate. The process thus becomes one of

mutual adjustment of forces between the unit and the aggregate, and results in the attainment of a balance or reciprocity between the corporate integrity of the unit and the more general corporate integrity of the aggregate to which it belongs. But we have already seen that the corporate integrity of any aggregate gives us a general definition of "Welfare", so we may finally describe the process we are considering as the attainment of a balance between the welfare of the unit and the welfare of the aggregate which includes it.

As this process takes place through successive stages of evolution the adaptive modifications of the successive orders of aggregates become increasingly evident, and produce those successive manifestations of new powers and functions which the Psycho-Physical hypothesis attributes to a gradual emanation of the psychic element of Reality.

When the process reaches its final stage we can replace the general terms in which we have described it by terms which express our social and moral concepts. Instead of referring to simple aggregates as component units of compound aggregates we can speak of individual human beings as members of organized societies. The corporate integrity of the simple aggregate and of the compound aggregate become respectively the welfare of the individual and the welfare of the community. The adaptive modification which the component aggregate undergoes through its association with the compound aggregate, based on the reciprocity between their respective equilibria and exhibiting, in the words of our formula, "qualities which were not exhibited in their unassociated condition", becomes the

development in the socialized individual of a moral sense of reciprocal Right and Duty.

For the concept of Right and Duty is based on that of Welfare. To revert to our general terms, the ultimate reciprocity between the equilibrium of the component aggregate and that of the compound aggregate consists, as has been stated, in a modification of the former in subservience to the establishment and maintenance of the latter. The resulting relationship between aggregate and unit is thus a relationship between the dominating influence of an integrated whole and the response to that influence by a subsidiary unit of the whole.

This relationship, developing throughout the entire Psycho-Physical process, appears at the level of human intelligence as an intuitive awareness of Right and Duty; the maintenance of its corporate integrity—its Welfare—by the social aggregate appearing as the concept of Right, and the adaptation of its Welfare to the furtherance of this end by the individual unit developing into the concept of Duty. Moreover, as throughout the pre-conscious process the equilibrium of the unit is modified only so far as is needful for the maintenance of the higher order of equilibrium, so the sacrifice of the individual Welfare is demanded only so far as is needful for the social Welfare. Thus the Social Welfare and the individual Welfare, reciprocally inter-related throughout the whole community, attain their final relationship as a mutual balance or equilibrium in the social order, and this balance is what we term Justice. So Justice as an abstract principle may be defined as the integrated reciprocity of Right and Duty.

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But as a practical precept for the guidance of men nothing can better the immortal Golden Rule : “ Do unto others as ye would they should do unto you ” ; in which this reciprocity is clearly indicated, the first part of the injunction forming an exhortation to Duty and the second expressing a declaration of Right.

VIII

HEREDITY

RECENT researches in Biology have been largely devoted to studies of the structure and functions of reproductive cells and the phenomena of cell division in the fertilized ovum. Detailed examination of the microscopic structure of the cell has yielded a vast addition to our knowledge of the so-called mechanism of heredity, as shown in the arrangements of the chromosomes and their constituent genes, while the movements of these minute elements, their attractions and repulsions, their associations and interactions have revealed activities of wonderful complexity and orderliness. These investigations have gone along with a rapid development of the Mendelian theory of heredity—indeed they seem to have been chiefly inspired and promoted under the influence of this theory—with the result that Mendelism has come to be regarded almost as an exact science comparable in its methods with the higher branches of mathematics.

An outstanding feature of these researches has been a growing tendency to abandon the old “Lamarckian factors” of evolution. The great majority of biologists now deny or gravely doubt the inheritance of “acquired characters”, whether imposed directly by the environment or induced by the activities of the organism itself. This sceptical attitude has been brought about by two factors—want of satisfactory evidence and want of a satisfactory hypothesis. Certain recent cases of

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supposed inheritance of acquired characters have been found, on careful examination, to be lacking in conclusive evidence, and no really decisive case has been brought forward. Moreover, no rational hypothesis has been adduced to suggest how a change externally brought about in the body-cells of an organism can affect the germ-cells in such a way as to produce a corresponding somatic modification in the offspring. It should be noted, however, that though the influence of the environment may not have any direct effect on the course of heredity, it still has a considerable indirect effect by way of selection. All variations inherent in the germ-cells are potential causes of modifications in the body-cells in response to the influence of the environment. Should these modifications prove beneficial to the organism, the individuals possessing them would come under the influence of natural selection, and the innate potentialities of the germ-cells which gave rise to such modifications would be selected and transmitted. It would still be true, however, that all evolutionary change would be dependent on spontaneous changes inherent in the germ-cells alone, unaffected by any bodily changes undergone by the individual during its contact with the environment. The succession of germinal elements and of somatic forms would run parallel to each other, but the causal connection between them would operate only in one direction, from the former to the latter, and Weismann's "continuity of the germ-plasm", like the thread running through the necklace, would be the sole factor of organic unity and evolutionary change. To a theory which regards evolution not merely as a

physical but as a psycho-physical process, this view of germinal continuity and independence of the physical environment is of the greatest significance.

If the environment has no influence whatever on the germ-plasm the question of the nature and origin of germinal variation is of supreme interest and importance. As is well known, Darwin did not inquire into the origin of the variations which supplied the material for the operation of natural selection. The undoubted fact of their existence was sufficient, and assuming that they were "fortuitous" in their occurrence and that they occurred in all directions, favourable or unfavourable as regards survival value, the question of their origin was not of much importance for his theory. Nor have modern biologists done much to solve the problem. Their chromosomes, genes and all the mechanism of heredity connected therewith have been intensively studied, but whence came these highly complex bearers of hereditary qualities, and how arose the mutations large or small which they initiate, the latest investigations in cytology have not revealed. The hypothesis of the inheritance of acquired characters did, at any rate, furnish some basis for variations, and also supplied an explanation of that *directive* quality of variation which is so manifest in organic evolution. The physical forces of the environment were supposed to mould the living organism in such a way as to adapt it to the incidence of these forces. If the influence of these physical forces on the organism has no bearing on heredity—as is probably the case—it would seem that this directive agency must be sought elsewhere.

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We have seen in a previous article that evolution, regarded as a psycho-physical process, presents as its most salient feature a progressive differentiation of the principle of Activity and the principle of Inertia—or, as we have named them in accordance with their fully developed manifestations, the Psychic and Physical principles respectively. Here we see the significance of that rather strange feature which characterizes the germ-cells, their comparative isolation from and independence of the body-cells, and their insusceptibility to any of the influences which the environment may exert on the latter. We are justified in regarding this as an example of that progressive differentiation which the psycho-physical theory postulates. This differentiation between germ-cells and body-cells begins almost at the origin of life itself, and appears to some extent among the lowest forms such as certain of the Protozoa. In another article, "The Associative Principle in Evolution", dealing with the development of sex, this differentiation has been traced in some detail, so it need not be dealt with here.

We have also seen that this differentiation is always characterized by an increase in mobility and instability of equilibrium. The transformation of a more stable equilibrium into a less stable form indicates the release of energies which were potentially present in the former, and we can interpret the progressive changes in the constitution and character of the germinal elements—their "variations"—as an emergence of the psychic activity accompanied by increased instability and more mobile forms of equilibrium. Thus the variations of the germ-plasm are spontaneous in a very real

sense, implying not a negation of law, but conformity with the law of inherent Activity—as opposed to the law of Inertia or Causation—which has been already referred to in relation to its higher manifestations as the Law of Volition.

Hence the germ-cell in the higher vertebrates and in mankind represents the final term of an age-long series which has continuously diverged from and become independent of the body-cells to which it has given rise in each generation. And the progressive appearance of spontaneous psychic activity accompanying this psycho-physical differentiation would account for that directive quality which it manifests—that quality which makes it, on the whole, an *ascending* series. Thus the germ-cell of every living form represents a system of potential activity naturally selected and transmitted throughout a long series of antecedent potential activities, and awaiting only its contact with the environment to be transformed into the system of kinetic activity which is the living body. This transformation is initiated by the process of fertilization, and its starting point is the fertilized ovum with its complete hereditary equipment.

Bearing in mind that the phylogenic development of the germ-cell is a process involving an ever increasing degree of instability and inherent activity, with ever new potentialities of inter-action with the environment, let us briefly consider the process of ontogenic development in terms of a series of such inter-actions.

We may take as an example the successive reactions to the environment involved in the evolution of the eye. These are supposed to

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consist, in its earlier stages, of a series which may be broadly stated as follows :—

- A. The development of photo-sensitivity in certain cells of the body surface.
- B. Positive heliotropism leading to the grouping of the more sensitive cells in areas of greater incidence of light.
- C. Formation of pigment, and consequent absorption of energy by these grouped cells.
- D. The discharge of this energy through the area lying behind the grouped cells, and the gradual formation of nerve tracks through this area.
- E. The coalescence and inter-connection of these nerve tracks to form a nerve-centre or ganglion.

Of course innumerable other activities would also be involved, but these five stages will be sufficient as a simple illustration of the supposed process. But whatever the stages may be, the main point is that we are to regard each stage, not as being solely dependent on the physical action of the environment, but as a relationship between the environment and the organism, conditioned and made possible at each succeeding level of activity by an increasing mobility and instability of the cellular structure. Thus, while the environment may be said to supply the propulsive force, the activity of the organism may be said to supply a directive influence along a definite line—the line of psycho-physical differentiation.

Since each stage of the process appears as an elaboration of structure and function superposed

on the preceding stage, the suggestion of an increased mobility and delicacy of equilibrium is almost irresistible. We are led to envisage each stage as marking a certain level of mobility, and conditioned by the limit of response which that particular degree of mobility can make. Stage A, for instance, would represent the earliest degree of mobility—the *least mobile* condition of protoplasm involved in this series. Supposing that while stage A is being developed the general protoplasmic structure exhibits a slightly higher degree of instability. Stage B would then become possible; while this, after a further increase of mobility, would lead on to stage C; and successively to stages D and E.

A consequence of the greatest significance is here involved. As each increase of mobility gives rise to each succeeding stage of the series, each preceding stage acquires *a greater degree of mobility than is needed for its response to the external stimulus which originally evoked it*. The result would be a modification of the equilibrium due to this excess of mobility alone, and independently of the original stimulus—a spontaneous change in the protoplasmic structure apart from any external force. And since, by hypothesis, the requirements of survival have all along been selecting and preserving the germinal potentialities underlying the whole series of modifications, this spontaneous change of structure would take place along an established line of change—would be of the same kind as the originally induced change. Moreover, as the spontaneous change would be independent of any external stimulus, but would be due to a general increase of metabolic

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activity governing individual development, the spontaneous change would gradually occur earlier in time and would, as it were, anticipate the stimulus which originally called it forth.

It may be objected that all this is pure hypothesis, but no hypothesis should be summarily rejected if it succeeds in accounting for facts hitherto unexplained. The hypothesis here suggested offers some explanation of that most remarkable phenomenon of embryology, the development of fœtal structures before the incidence of the external stimuli to which they will respond during the individual's life, and in apparent anticipation of the purposes they are destined to serve. One of the most striking instances of this is furnished by the case here chosen as an illustration—the development of the eye—where we find the mammalian fœtus equipped with a fully perfected organ of vision long before a single ray of light has ever reached it. This seeming power of unconscious prevision is also found in the case of many instinctive acts which are started long before the time when their final “purpose” will be achieved.

The foregoing treatment of heredity in psycho-physical terms is justifiable, since germ plasm seems to constitute, along with psycho plasm, the highest form of psycho-physical activity yet attained in the spheres of life and mind respectively. Nor does the resemblance between germ cells and brain cells end here. They are both systems of potential energy dependent on their relationships with the environment for all their active manifestations. As the brain would never develop intelligence and thought apart from those relationships with the

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physical world which we know as sensation and perception, so the fertilized ovum would never develop into a bodily structure apart from its reactivities to certain definite physical conditions—reactivities which we have seen to be of such a nature as almost to merit the description of “unconscious memory” and “unconscious purpose”.

IX

ENVIRONMENT

THROUGHOUT the foregoing articles evolution has been interpreted as a progressive series of co-operative associations taking place within those psycho-physical aggregates known to us as material existents. These co-operative associations may be regarded as the *internal relations* exhibited by the material world. It will be of interest to inquire whether a similar progressive series can be detected among the reactions which take place between psycho-physical aggregates as independent entities, and which constitute their *external relations*. And while the preceding article was mainly concerned with the internal relations of germ-plasm and body-plasm as the basis of Heredity, we shall now be concerned with the external relations between organic aggregates and physical forces as manifesting the influence of environment.

These external reactions may be classified, as the internal associations have been classified, under the four heads Physical, Chemical, Vital, and Mental, and when thus distinguished it at once becomes evident that the mutual reactions which characterize the four classes differ profoundly from each other. To take a simple example from each class, we can see that the reaction of a billiard ball to the striking cue, the reaction of a heap of gunpowder to a lighted match, the reaction of an amoeba to the food particles around it, and the reaction of the human mind to its perceptual experiences differ so entirely

in kind that they have to be placed in quite separate classes and described in quite different terms. Confining ourselves to the roughest sort of description, the various types of reaction may be set down as follows :—

- (1) *Physical*. The reactions between material bodies may be comprehensively described as Identical Reaction. The body acted on reacts passively to the impulse imposed by the body acting on it, and the reaction is identical with the action in quality and magnitude. In fact physical reactions lie completely within the scope of Newton's Third Law of Motion.
- (2) *Chemical*. The kind of reaction exhibited in chemical combinations may be called Differential Reactivity. The reaction takes the form of a breakdown of equilibrium and is totally different in quality and magnitude from the stimulus which evokes it, exhibiting an activity which indicates the existence of forces latent in the chemical aggregate—as in the case of gunpowder exploded by a spark. But the reactivity, though differing from the stimulus, is always the same for the same stimulus. And the reactivity of a chemical aggregate, once exerted, is incapable of repetition—the equilibrium, once broken down, is not restored.
- (3) *Vital*. The reactions of living matter below the level of Mind may be grouped under the general term Organized Reflex. The stimulus, as in the case of the chemical aggregate, causes a breakdown of equilibrium, but the vital aggregate possesses the power of restoring its

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equilibrium and adjusting it to the incidence of the external force—that is, it can develop an organized reflex capable of meeting the situation. Moreover, unlike the chemical compound, the living organism can react to the same stimulus in different ways according to changes in its own internal state.

- (4) *Mental*. The reactions of Mind to physical stimuli arise by imperceptible degrees out of vital reactions, advancing from Reflex Action to the highest manifestations of what may be termed Spontaneous Response. These, transcending the Physical Law of Causation, have to be classed under the psychic Law of Volition.

The foregoing classification, brief and inadequate though it be, is sufficient to show that the external relations between psycho-physical aggregates pursue a progressive and ordered sequence akin to that pursued by their internal associative relations. For this sequence of external relations which we have respectively named Reaction, Reactivity, Reflex and Response is, like the internal relations, characterized by a progressive increase in plasticity of structure and mobility of function which irresistibly suggests that their common element is the emergence of a cosmic Principle of Activity.

Leaving these general considerations we shall now give special attention to the third item of our classification, the Organized Reflex, in its bearing on our present subject, the relationship between the living organism and its environment.

In the article on Heredity it was pointed out that the germ-plasm of the fertilized ovum embodied the sum total of all the hereditary potentialities of the race. It was also pointed out that the phenomenon of Variation, ever present side by side with Heredity, could—in view of the isolation of the germ-plasm from external influence—be most reasonably interpreted as a spontaneous efflux of kinetic energy effecting a general increase of mobility and instability throughout racial development. In short, the germ-plasm of the fertilized ovum has to be regarded, not only as a static reservoir of hereditary qualities, but as an ever active fountain of progressive change—a fountain of energy whence arise new metabolisms, new adjustments of equilibrium to the incidence of external forces, in short all those changes described in general as adaptations to the environment.

This problem of adaptation—the question as to the development of organically established adaptations independently of the direct action of external stimuli—was briefly touched on in the preceding article, but demands further consideration here as it is more relevant to our present subject. The question may be plainly stated thus:—How comes it that structures and functions obviously adapted to meet environmental conditions can be originated and reach a high degree of development in the individual organism long before these environmental conditions are actually encountered?

In the classification of external relationships just given, the Organized Reflex was described in

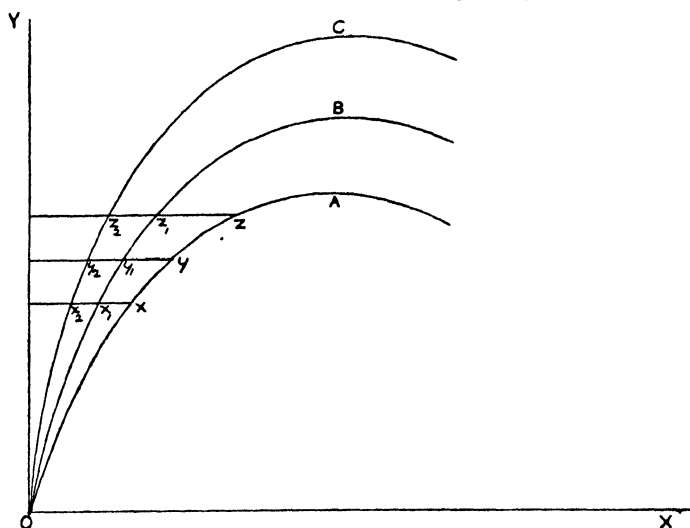
terms of metabolic activity—the external stimulus being associated with a breakdown of organic equilibrium, and the reflex being associated with a restoration of equilibrium modified in adjustment to the stimulus. The modification may perhaps be determined in such a way as to effect the requisite adjustment with the least expenditure of energy.

If this be a correct interpretation of the reflex activity of living organisms it would, along with the hypothesis of a continuous increase of protoplasmic instability, furnish a clue to the solution of our problem. The operation of these two factors may be illustrated thus. Let us suppose that an organic structure has become definitely established throughout a long period of *direct contact with an external stimulus*. If, during this period of evolution, the protoplasmic instability has been increasing it would eventually reach a level at which the equilibrium associated with the established structure might undergo a spontaneous breakdown independently of the external stimulus which originally caused it. And as this increase of instability is supposed to take place progressively throughout the racial development, the critical level of instability at which the equilibrium breaks down would occur progressively earlier in time, since in the later stages of racial development the germ-plasm would be endowed with greater metabolic activity, and would thus arrive at each corresponding point of the earlier stage more quickly. The result would be that the formation of the organic structure would be generally pushed back towards the earlier stages of individual development.

This hypothesis derives some support from the interesting biological phenomenon of the Conditioned Reflex, which has recently attracted attention through the experiments of Professor Pavlov and his school. Perhaps the best known of these experiments is the one dealing with the reflex action which produces salivation in the presence of food. A dog salivates when food is offered to it, but if a bell be always rung simultaneously with the presentation of the food it was found that, after a sufficiently large number of such "conditioned" presentations, the salivation would follow the sound of the bell alone, unaccompanied by the sight of food. This persistence of the response despite the complete change in the stimulus is called a Conditioned Reflex, and it is held (somewhat overconfidently, one is inclined to think) to support the rather extravagant and bizarre conclusions of the Behaviourist philosophy. Be that as it may, the Conditioned Reflex does seem to support the more modest conclusion that if such different stimuli as a plate of food and the sound of a bell can be made to evoke the same response, the activities of living matter must be of such an exceedingly mobile and impressionable nature as to become indistinguishable from spontaneity. Indeed, the Conditioned Reflex may be generated subjectively, as when a hungry man's salivary glands respond, not to food itself, but to a mere idea or image of food—the image, for instance, of a succulent mutton chop. And from this it would seem to be but a small step to the evocation of an Organized Reflex by a mere breakdown of protoplasmic equilibrium occasioned by its own instability.

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The subject we are discussing will be made clearer by the aid of the following diagram.



Let OX and OY be taken as axes of co-ordinates, OX representing time of individual growth and OY representing the advance of evolutionary development. The three curves OA , OB , and OC represent individual growth at the three stages of this racial evolution, each individual life starting with the fertilized ovum at O and reaching maturity at the summits of the curves A , B , and C . The points x, y, z , x_1, y_1, z_1 , and x_2, y_2, z_2 represent successive stages in the development of some particular organ at the respective stages of evolution of the species.

Suppose the points x, y, z on the lowest curve to represent the development of this organ in a relatively primitive form of the species and in response to the *direct influence of the environment*, while

the corresponding points on the two higher curves, situated at equal distances above the origin, stand for corresponding stages of the organ's development at the two higher evolutionary levels where we have supposed the metabolic process to be spontaneously initiated by the increased instability of the protoplasm involved. This increased instability, implying increased rate of change in the growth of the organ, is represented in the diagram by the steeper gradients of the two upper curves at the levels in question—a relationship which will be familiar to anyone acquainted with the Differential Calculus.

It will be seen at once that the series of points on the curve OB is situated to the left of the original series on the curve OA , and that the series on the curve OC at a still higher stage of evolution is still farther to the left. As the axis OX represents lapse of time in the life of the individual, this means that the stages of development of the evolving organ occur progressively *earlier* in the individual's life as evolution advances.

It is also obvious that since the gradients of the curves OB and OC are successively steeper than that of the curve OA , the horizontal distances between the points x_1, y_1, z_1 , and still more those between the points x_2, y_2, z_2 , will be less than the horizontal distances between x, y, z . That is to say, the stages of development of the evolving organ will become more and more *crowded together in time* as evolution advances.

It scarcely needs to be stated that this accords exactly with the facts of embryology. Bodily characters which must have appeared in the mature individuals of an ancestral race appear much

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earlier in the individual lives of the evolved species, often appearing during foetal life, and their development is effected with immensely greater rapidity. Hence the well known dictum which Haeckel called the Biogenetic Law :—The growth of the individual recapitulates the history of the race.

The subject discussed in this article, viewed in its broadest aspect as the problem of relationship between the living and the non-living, may be regarded as constituting—next to that of the origin of life itself—the most important problem of biology. If our psycho-physical view of evolution has succeeded in suggesting, however tentatively, a solution of this problem it may, to that extent, claim a measure of support.

X

PERCEPTION

THE NATURE OF PERCEPTION

OF the many implications which follow from the Psycho-Physical theory perhaps the most significant and profound is the conception it entails regarding the nature of Perception. To realize this particular implication we must revert to the article entitled "Évolution as a Psycho-Physical Process".

That article set forth in a series of propositions a view of evolution as a continuous advance from the psycho-physical relations constituting what we call "Matter" to a new order of relationships, superposed thereon, between inter-psychic systems and psycho-physical systems constituting what we call "Consciousness". The conclusions thus suggested may be usefully restated in definitive form as follows :—

- (1) The ultimate constituents of Matter are systems of psycho-physical relationships ranging in degree of stability from the comparatively stable atoms of the inert elements to the most extreme forms of instability in sentient protoplasm.
- (2) The ultimate constituents of Mind are systems of inter-psychic relationships, differentiated from but immanent within the psycho-physical systems forming the brains of conscious beings. These psychic systems, having become completely differentiated from the psycho-physical

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systems in which they arise, manifest laws and functions of a totally new character—psychic laws which are in fundamental contrast with physical laws, and which exhibit in their operation the quality of Spontaneity in place of Necessity, and Volition in place of Causation.

- (3) The ultimate constituent or unit of Perception is some change in the functional activity of Mind the nature of which, since it occurs *in Mind*, can never be known *to Mind*, but must ever remain inscrutable. But this change is known to be always closely associated with a metabolic activity—a breakdown and restoration of equilibrium—in the psycho-physical system of a conscious brain, and can thus be interpreted as exhibiting some order of super-relationship between the psychic and the psycho-physical systems.

This view of Matter, of Mind, and of the relation between them constituting Perception has important bearings on some of the most fundamental problems of Psychology. Of these the primary problem would appear to be that of the possibility of any relation at all between Matter and Mind.

This is indeed the fundamental problem of pure Dualism. In later philosophy Dualism is identified with the system of Descartes which regards Mind and Matter as two absolutely disparate existences. As such existences cannot be conceived as being in any way related to each other the apparent interaction between them had to be explained on the purely metaphysical hypothesis of "Occasionalism"—associated with Malebranche—and that of

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“Pre-established Harmony”, identified with the philosophy of Leibniz. As neither of these “explanations” is calculated to carry any conviction to the modern mind pure Dualism would appear to be still confronted with the problem of how the two supposedly disparate existences, Mind and Matter, could possibly exhibit that intimate inter-action which every perceptual relationship undoubtedly manifests.

To Psycho-Physical Monism the problem does not present itself at all, for in this view *all matter possesses a psychic element*, and the notion of an inter-relation between a psychic system (Mind) and a psycho-physical system (Matter) involves no logical or philosophical difficulty. So far from being two disparate existences, Mind and Matter are regarded as different systems of relationships between two co-existent attributes of one eternal Reality.

While the Psycho-Physical hypothesis thus completely escapes the fundamental difficulty regarding the perceptual relationship which confronts the philosophy of Dualism, it suggests some interesting speculations concerning certain characteristics of Perception itself.

OBJECTIVE REFERENCE

We have found reason to interpret the evolutionary development of Mind as a progressive differentiation of psychic systems within the psycho-physical systems which constitute the ascending orders of Matter. At the lower end of this series we have the rigid, determinate, and stable systems exemplified in the atoms of the more inert elements—

presumably the earliest forms of atomic structure—in which the principle of Inertia predominates over the principle of Activity, and the Law of Inertia is consequently supreme. At the upper end we have, in the systems forming living brains, the extreme examples of mobility and instability of equilibrium, resulting in a complete differentiation of psychic systems wherein the principle of Activity predominates over the principle of Inertia, and the Law of inherent, spontaneous Activity—expressed in psychic terms as the Law of Volition—is fully manifested. It logically follows that in the course of this ascending series there must occur a point at which the psychic and physical activities reach a condition of mutual balance—a point below which the psycho-physical systems manifest properties of distinctively physical and determinate character, and above which a psychic and spontaneous order of function prevails. The former may be conveniently termed the “matter-like”, and the latter the “mind-like” stage of cosmic evolution, and all the evidence of science seems to suggest that this dividing line occurs at the inception of Life. Thus we may regard the Physical and Chemical functions as lying within the matter-like order, while the Vital and Neural functions, ranging from the dawn of Life to the actual manifestation of Consciousness, may be comprehensively grouped under the term mind-like.

It is probably a safe assumption that the complete development of Consciousness is everywhere dependent on the development of nervous systems, and the gradual, progressive development of nervous systems out of vital systems is one of the most

salient facts of organic evolution. Thus we may regard nerve function as an intermediate stage—a connecting link—between life function and mind function or Consciousness, and as possessing a more mind-like quality than that possessed by living matter pure and simple. And this distinction is fully justified, since the nerve functions known as reflex action and instinctive behaviour are distinctly more mind-like than the undirected irritability of nerveless living matter. And we may, of course, assume that in man the neural functions assume their highest form, while in the neurones of the cerebral cortex their mind-like quality reaches a height which is all but Mind itself, since here their metabolic activity is the immediate precursor of Consciousness.

In the definition of Perception given in Paragraph 3 at the beginning of this article it was interpreted as a super-relationship between the psychic system of Mind and the psycho-physical system—the brain—within which the psychic system functions as a differentiated order of inter-psychic relationships. If, as we have now envisaged it, the brain function itself be of such a highly mind-like quality as to approach within an infinitesimal limit the purely psychic function of Mind, this super-relationship (Perception) would involve no immediate sense of discontinuity—of contrast between *perceiver* and *perceived*—for the minute distinction between the mind function and the brain function might well lie beyond the conceptual limit itself—see article, “The Conceptual Limit”. And once this infinitesimal gap were over-leapt the neural system would present no further gap, for the neural impulse

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which causes the metabolic change in the neurones could be traced back without a break along the incoming nervous system till it reaches the external organ of sense. Here only and finally would occur the break of continuity in the causal sequence of mind-like activity, for here this activity itself ceases. Here, at the periphery of the organism, occurs the perceptually impassable gap separating the mind-like activities of the living body and the matter-like activities of the inorganic world. Here then, presumably, would Mind place the originating cause of its Perceptions, and would thus acquire its irresistible conviction of the existence of an "external world". The "thing perceived", though it be really a metabolic function of the neurones of the brain, would be envisaged by Mind as an "external object".

It may be objected that this interpretation takes no account of dreams and other hallucinations. The world perceived in dreams appears to be just as much an "external world" as the world of normal perception, though its causation is entirely due to mind-like functions and is independent of the organs of sense. But it must be remembered that dreams, though arising from spontaneous metabolic processes in the neurones, consist always of copies or images of waking perceptions, however incongruous or grotesque may be their visionary combinations. It is quite understandable, therefore, that the objective reference irresistibly associated with the waking perceptions would attach itself to the dream perceptions, and give them a corresponding appearance of externality.

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DUALITY

Anyone acquainted with the history of philosophy must be familiar with the distinction drawn by Locke between the "primary" and the "secondary" attributes of Matter. The former, consisting of extension, form, resistance, etc., were held to be essentially inherent in material bodies, while the latter, consisting of colours, sounds, tastes and smells, though appertaining to material bodies were not absolutely inherent in them. This was proved by the fact that we can imagine a material body as being completely deprived of such attributes as colour, audibility, etc., and yet conceive of it as still existing ; whereas in the absence of the primary attributes the existence of the object as a material body would disappear.

This distinction is not generally recognized in modern philosophy. The doctrine of the relativity of all perceptual knowledge—which regards all perception as a relationship between the subject perceiving and the object perceived—can logically draw no such distinction between percepts. And the study of biological evolution, showing as it does the gradual development of the various sense organs out of undifferentiated surface cells, and the gradual development of the various senses out of a primitive tactual sense, confirms this view. The perceptions given by all our five senses are thus seen to be on precisely the same footing as regards the relativity of the knowledge they give us. The primary attributes can be no more "inherent in the object" than the secondary ones. All perceptions can give us only a relative knowledge of

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the object, the real, inherent nature of which remains for ever unknown. Indeed, the very latest development of Physics, which reduces material objects to Differential Equations, seems disposed to rest content with this analysis and to regard the entities with which they deal as something so recondite that even to mention them is absurd.

Yet, as Locke so clearly saw, there does seem to be some fundamental difference between his primary and secondary attributes, though, as just stated, this difference cannot be a matter of the objective inherence or non-inherence of these attributes. And in one respect at least the difference is by no means vague, but can be clearly formulated. This is that the primary attributes are *quantitative* while the secondary attributes are *qualitative*. Extension, form, and atomic energy—the basis of “resistance”—are spatially measurable, and their differences can be expressed in spatial terms, while colours, sounds, tastes and smells are not spatially measurable, and their differences are always differences of quality or intensity. And it is fully acknowledged that quantitative relationships appertain to the material world, while qualitative relationships belong essentially to the mental world. Things admit of measurement in space, but Thoughts are non-spatial.

This distinction acquires a profound significance when considered in relation to the Psycho-Physical hypothesis. If all Matter contains a psychic as well as a physical principle the duality of Perception becomes explicable, for Perception, as a relationship between a psychic system and a psycho-physical

system, would exhibit a co-existence of two intermingled attributes—a predominantly physical attribute arising from the interaction of Mind with the physical principle of Matter, and a psychic attribute arising from its concomitant interaction with the psychic principle. Thus Mind, receiving into Consciousness a percept of this composite nature would, as we have seen, refer it as a whole to an external object as its ultimate exciting cause, but the percept would present itself in two aspects. The factor constituting the “primary” attribute of the object, apprehended in a purely spatial aspect, would appear as something alien to Mind—something independent of it and beyond its control, since no imaginative effort of Mind could eliminate it from its apparent inherence in the object, short of the object’s own complete annihilation. On the other hand, the factor appearing as the “secondary” attribute of the object would, by virtue of its non-spatial and qualitative character and its amenability to the mental operation of dissociating it from the object, present a sharp contrast with the “primary” attribute, and thus would appear to be something of a nature more akin to Mind itself. In a word, the duality of the perceptual relationship would be the simple and comprehensible result of the fundamental duality of its objective term.

Here one is tempted to venture on a further speculation. May not this view of the qualitative aspects of the physical world furnish a clue to the solution of the problem regarding the objective existence of our æsthetic values? If colours and sounds owe their existence to a psychic principle in the material world so would the infinitely varied

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groupings and inter-relations presented by them in the scenes of Nature and the works of Art. Thus the fundamental basis of our sense of beauty would *really exist* in the material world independently of our own minds.

And that still deeper and holier sense of kinship and communion with Nature, which is felt by all contemplative minds and which finds such perfect expression in the poetry of Wordsworth, would also receive an explanation. This sense of kinship with Nature would be due to the existence in common of one universal Psychic Principle—to the fact that our minds, our souls—"the soul that riseth with us, our life's star"—can recognize the existence in Nature of that spiritual order of being whence it has itself come—a world-soul, not indeed star-like and arisen, but weighted and enchained by the Inertia of Matter, yet immanent and potential in all things. To every lover of Nature such a conception of a real and all-pervading unity must appear singularly attractive.

XI

PSYCHIC DETERMINISM

WHAT is Chance? The popular notion seems to be that the idea of chance involves an absence of Law : that a chance occurrence is one which takes place in a fortuitous way and quite independently of causal influences. One wonders how many bridge players—especially those who believe in “luck”—realize that the hands they hold are as much the determinate products of physical laws as are the orderly movements of a steam engine or a clock. And yet this is quite obviously the case. All the appliances and processes of gaming—the shuffling of a pack of cards, the spinning of a coin, the rattling of a dice-box, or the revolution of a roulette wheel are completely subject to the laws of physical causation, and their results could be accurately predicted were all the physical forces governing each case completely known.

What, then, is the principle which introduces the element of chance? It is simply that the conditions of the particular mechanical system in operation are such that though the physical forces acting on the system are quite unknown and practically incalculable, their incidences or causal effects on it must be equal and uniform. Take for instance the shaking of a dice-box. The physical forces acting on the die are incalculable, but if the die be an accurately shaped cube of uniform density each of its six sides would be equally susceptible to the incidence of these forces, and hence each of them would be equally likely to fall uppermost when the die is

thrown. And since one of the six sides *must* fall uppermost, the chance that any given one *will* fall uppermost is one-sixth of certainty. This is the fundamental principle of the Theory of Probability, and the following definition may be given:—

A chance occurrence is one of a number of possible occurrences, all of which are equally likely to occur and one of which is certain to occur.

Another type of Probability is based on those numerical inductions called statistical averages. The registrations of births, marriages and deaths each year throughout a large population are found to be fairly constant, and it is on such figures that birth-rates, marriage-rates, death-rates and tables showing an individual's expectation of life at different ages are based. Thus it is possible to calculate a given young man's chances of marrying, of committing suicide, or of murdering his mother-in-law. This type of Probability differs essentially from that dependent on physical causation, in that it depends largely on mental factors, but, as will presently be pointed out, these factors are none the less determinate.

The term "statistical averages" has recently come to be much used in physics where it has been raised to a position of unwonted dignity, since this principle of simple numerical induction is being seriously presented to the attention of philosophy as a substitute for the Law of Causation. The latest developments in physics have led to the conclusion that the electron appears to behave in an entirely unpredictable and capricious manner, jumping from one orbit to another "when it ikes" (Bertrand Russell in *The Analysis of Matter*).

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This discovery seems to have made the physicists themselves jump to the conclusion that these ultimate infinitesimals of the physical world act in a completely indeterminate and random way quite independently of causation. In face of this tremendous conclusion one is tempted to reflect on the attitude which the nineteenth century scientist would have adopted if confronted with such a discovery. He would have shown the utmost caution in forming any conclusion at all; would have assumed that the jumping of the electron was due to the operation of some deeper law as yet unknown; and would have patiently set himself to discover it.

Having decided that indeterminacy or "randomness" to use the uncouth expression now often adopted—is the only principle, if such it can be called, operating among the ultimate physical entities, the physicist had to account for the unconditional uniformities of causation which the ordinary observable phenomena of the physical world undoubtedly exhibit. To do this the principle of statistical averages is invoked. Though an individual electron may jump just when it likes, the billions of electrons which take part in the creation of natural phenomena must somehow be supposed to jump in unison, and moreover in such unerring, unbroken, and yet intricate unison that the universal, unconditional, and complex sequences of causes and effects come to be exactly simulated.

In view of the importance thus attached to statistical averages it will be of interest to examine the principle on which this branch of the Theory of Probability is based.

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It has already been pointed out that in a chance occurrence the parts of the mechanical system concerned in the production of the occurrence are equally susceptible to the incidence of all the causal forces operating on it. Thus when a coin is spun in the air, if it be perfectly balanced each of its two sides is equally capable of being affected by the physical forces influencing its motion, and hence it is equally likely to fall "heads" or "tails".

But though the two sides of the coin are *equally susceptible* to these forces, as a matter of fact they are *differently affected* in each single case, and hence though the coin is *equally likely* to fall heads or tails it does as a matter of fact fall *either heads or tails* in each individual spin. This result of each spin may be called the individual effect on the coin, while the uniformity in the incidence of the forces due to the mechanical conditions may be called the general effect. Now it is readily seen that while in a single spin of the coin the individual effect is at its maximum, in a very large number of spins the individual effects would tend to cancel each other out, and the general effect due to the coin's mechanical condition of equal affectability would remain outstanding. The result would be that the larger the number of spins the closer would be the approach to equality in the number of heads and tails thrown, and this equality would furnish a statistical average. The same reasoning applies to the second type of Probability above referred to, though in this case the laws involved largely consist of mental laws intermingled with physical ones.

It will be observed that throughout this discussion *the operation of law*, whether physical or mental, has

been invoked, and hence we are justified in stating that the principle of statistical averages is based on the operation of laws or uniformities among the ultimate existents whose functions furnish the data of these averages. If the activities of the ultimate existents be entirely lawless and capricious the foundation for a statistical average of those activities would disappear. No uniformity, real or apparent, can ever arise out of indeterminacy, nor can order ever evolve out of chaos. If the cosmos be an ordered system now—as it undoubtedly appears to be—order must have ruled throughout all time.

Even more remarkable than the modern physicists' substitution of statistical averages for the Law of Causation is his discovery in the saltatory caprices of electrons and the "randomness" of quantum phenomena the actual basis of Free Will. While in ordinary lumps of matter this indeterminacy assumes, by virtue of statistical averages, the appearance of Causation, in those lumps of matter known as human brains the same negation of law brings about the appearance of something exactly the opposite of Causation. Perhaps this inconsistency may account for the apparent lack of enthusiasm which this explanation of Free Will has met with among the philosophers.

But after all, if the facts be really as stated, it may be that they only require a different interpretation. Perhaps these material concepts should be abandoned, and the electron and energy quantum should be regarded, not as purely physical but as psycho-physical entities. Perhaps the whole task of interpretation should be taken out of the hands of the physicists and entrusted to the philosophers,

especially as the former seem to be getting rather muddled as to what an electron really is, since it sometimes seems to behave like a "projectile" and at other times like a "wave".

This dual character, so embarrassing to the physicist, exhibited by the ultimate existents of the physical world is quite in keeping with the hypothesis of Psycho-Physical Monism, which would suggest that the electron is something neither purely inertial nor purely kinetic, but something which combines both attributes in one unitary existence—a kinetic-inertial, or, in its final aspect, a psycho-physical entity. If this be so we may regard the electron as the starting point of cosmic evolution, and its relationship with the atom as the first stage in that progressive series of associations and co-operations which, as has been repeatedly suggested, constitutes the entire cosmic process.

It has also been pointed out in the essay entitled "Factors of Moral Responsibility" that the cosmic process is based essentially on two principles, the one just referred to, which was there called the Psycho-Physical Law, and the principle of spontaneous and self-determined Activity inherent in immaterial substance. These two cosmic principles, reaching the level of Consciousness in individual minds, appear respectively as :—

- (1) An imperative social Conscience or Law of Duty extending the co-operative association to all individual minds in the social aggregate, and endowing this concept of social co-operation with the moral quality of Right.

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- (2) An indefeasible sense of spontaneity and freedom attaching itself to that mode of psychic activity which we call Volition, and giving us the irresistible conviction of Free Will.

Since these two cosmic principles reach the individual mind through the channel of heredity and impress themselves upon the mind with the authoritative force of law their operation may fitly be called Psychic Determinism. And it is this determinate character of psychic activity that furnishes the basis for those statistical averages used in our estimates of Probability with reference to human conduct.

A future essay, "The Intuitional Factor in Morals", will deal with the distinction between what are there termed Hedonistic Conduct and Moral Conduct, but something must be said here as to the bearing of this distinction on Psychic Determinism and Responsibility.

The two psychic principles (1) and (2) given above were stated to be based on the two fundamental cosmic principles of Association and Spontaneity. They stand on the same ground of universal and unconditional validity in the moral sphere as do the intuitive and necessary truths of intellectual apprehension in the sphere of Reason.

The Hedonistic Law, on the other hand, is derivative. It is not a fundamental principle of the cosmic process but a product of mental evolution, for pleasure or happiness is an element of consciousness and is non-existent prior to the advent of consciousness. An explicit statement of the Hedonistic Law—Every sentient being feels

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desire for pleasure and aversion from pain—of course implies this, since it refers only to *sentient* beings.

Thus we have two orders of law affecting human conduct ; one fundamental, *a priori* and subject to the Psychic Determinism of Volition ; the other derivative, as a function of Consciousness, and subject to the Physical Determinism of Causation. But here it may be urged that if all moral choice is subject to Determinism of some kind, does it not follow that Psychic Determinism would abolish moral responsibility just as completely as does the Physical Determinism of the materialists ?

The reply is that, in the first place, Psychic Determinism does not abolish responsibility since Psychic laws arise within the mind and are not imposed from without as are the physical laws of Materialism—the only ones which that system of thought recognizes. Psychic Determinism is *self-determinism*, and self determinism involves responsibility.

In the second place, the common notion that moral responsibility is dependent on the result of a conflict between two commensurable forces—a conflict similar to a physical tug-of-war—arises from a complete misapprehension of the problem. As pointed out above, the Moral Law and the Hedonistic Law are based on two entirely different principles and belong to entirely different planes or orders of being. The one is based on a fundamental and universal attribute of Reality while the other is derived from the concrete experiences of Mind in the course of its evolution. The two are therefore essentially incommensurable, and no

relationship of greater or less, stronger or weaker can exist between them. Other cases of similarly incommensurable relations between our concepts can be cited. For instance, no considerations of expediency, however strong, can outweigh a consideration of Justice; and no amount of evidence, however great—as in the case of an alleged “miracle”—can abrogate the Law of Causation. In like manner, however strong may be an impulse toward wrong doing, however great the strength of a “temptation”, they can only be effective through the Will, and the relationship is thus at once raised to the moral plane and enters the domain of Psychic Determinism. In the very act of “yielding to the temptation” the subject, if a normal person, feels that he is acting *voluntarily* and therefore *responsibly*.

Thus we conclude that Moral Responsibility, as a mental function operating entirely within the sphere of unconditioned Moral Law, is entirely independent of the Hedonistic Law, but depends solely on the existence in any individual mind of the two psychic intuitions, a conviction of Freedom and a conviction of Duty. Any person endowed with these intuitions is a morally responsible person, however strong may be the hedonistic impulses of his nature.

XII

THE ASSOCIATIVE PRINCIPLE IN EVOLUTION

HERBERT SPENCER has very convincingly shown that the evolutionary process, inorganic, organic, and super-organic, consists fundamentally of an advance from an indefinite, incoherent state to a definite, coherent state. In the sphere of inorganic evolution this is shown throughout by those aggregations and redistributions of matter with which physics and chemistry deal. Organic evolution shows it in the aggregations of cells into tissues, organs and organisms, with all those ever-increasing differentiations and complexities of structure and function which form the subject-matter of morphology and physiology. Super-organic evolution shows it in the increasing coherence and definiteness which accompany the development of social communities among man and the higher animals, as dealt with, in the case of man especially, in the science of sociology. And among human societies this universal world-process culminates in ethics.

Through organic and super-organic evolution the advance from an incoherent to a coherent state manifests itself in that associative principle which seems to govern all living things, from the primitive cell to the member of a developed human society. As this associative principle—manifested in its three great divisions of sexual association, parental association, and communal association—forms the basis of ethics, it will be of considerable interest

to trace its working from the very beginnings of life to its culmination in human communities, and thus to examine, as it were, morals in the making.

The growth and subdivision of a simple cell is a matter of equilibrium between nutrition and waste ; between the forces of aggregation and those of disruption. As the volume of a cell—the quantity of living matter it contains—increases more rapidly than its surface, and as all nutrition has to reach this living matter by way of the surface, there must come a stage in the cell's growth when the extent of surface can only permit of a supply of nutriment just sufficient to compensate for the waste. The cell then reaches a condition of equilibrium between nutrition and waste, and ceases to grow.

But the equilibrium is essentially an unstable one. The surface of the cell, by the very fact of its being the surface, is under different conditions from the interior of the cell, and the molecular elements of the protoplasm at the surface must, therefore, be different from the molecular elements of the interior. The protoplasm of the surface layer, by reason of its being in immediate contact with the surrounding medium, would probably be more adapted to rapid assimilation of the nutritive materials. It would probably contain a larger proportion of molecular motion—probably be of a more dynamic and active habit than the protoplasm of the interior, which would, on the other hand, exhibit a more inert, static or sluggish character. As the cell reaches its limiting state of equilibrium, and the amount of nutriment assimilable through the surface reaches its minimum, the active surface protoplasm would tend to assimilate

a disproportionately large share of it. We know that the vital functions of a cell have to be regarded as a sort of contest between the anabolic and the katabolic forces of the protoplasm. As long as the amount of nutriment available through the surface is more than sufficient for the performance of these functions, the contest could go on without any disturbance of the cell's equilibrium, but, as the available supply of nutriment reaches its limit, the contest between the predominantly katabolic surface protoplasm and the predominantly anabolic interior protoplasm would become sufficiently acute to disturb the already highly unstable equilibrium and bring about a disruption of the cell. The process of cell division would be initiated.

But this cell division would rarely be an absolutely equal division. It would very rarely happen that the plane of cleavage would pass exactly through the centre of the cell, but in the vast majority of cases the cell would divide into two portions not absolutely equal. Now, it follows from simple mathematical principles that when a spherical body, surrounded by an outer layer of material different from the inner mass, is divided by a cleavage plane into two unequal parts, the proportions of outer to inner substance in the two parts differ from each other and from that in the parent body. The smaller fragment would contain a larger proportion of outer layer to inner mass than the parent body possessed, and the larger fragment would contain a smaller proportion of outer layer to inner mass than the parent body possessed. Thus, when our supposed heterogeneously formed cell divides into two slightly

unequal "daughter cells", the smaller of the two would contain a greater proportion of active surface protoplasm than the larger. Successive subdivisions would continue and increase this differentiation, and there would thus eventually be evolved two functionally different kinds of cells—small, energetic cells containing a preponderant share of active, dynamic molecular elements; and large, inert, static cells manifesting an essentially sluggish and passive habit. Now, these are well known to be the distinguishing characteristics of "male" and "female" cells—of sperm and ovum—and thus we reach the conclusion that possibly the very earliest steps in cell division may also have initiated the first step in the great associative principle—the differentiation of sex.

Without further following up this hypothesis, we find that, as a matter of fact, sex differentiation does take place very low down in the organic scale, and hence our proposed survey of the associative principle will have to begin almost at the beginning of life itself.

Though among the protozoa, reproduction is generally non-sexual, it is often effected by processes which may be described as partially sexual. Thus, in the gregarina, reproduction sometimes takes place after the previous fusion of two individuals, and in paramoecium, an infusorian form, fission is sometimes preceded by conjugation. Though in most cases the individuals uniting are alike, in some cases they are unlike in form and size, thus seeming to foreshadow the beginnings of true sexual reproduction. This is seen among the infusoria in vorticella, where the stalked form becomes joined with a

small actively swimming form. Among the radiolaria there may be simple fission, or there may be a breaking up into minute germs or zoospores. All these various methods of reproduction seem distinctively to indicate the beginnings of sex differentiation.

Among the metazoa, sexual reproduction is practically universal, but it presents many intermediate forms before the perfect type is reached. Thus, in the porifera, sexual reproduction does not seem to be completely established, though sometimes ova and spermatozoa become developed in certain parts of the organism—the female elements in the deeper layers and the male elements in the more superficial ones—and fertilization of the former by the latter probably takes place. There is also a form of budding by gemmules which escape and develop into new sponges.

In the coelenterata sexual differentiation takes a further step, but is not yet completely established. In hydra, non-sexual reproduction by budding takes place in summer, and sexual reproduction in winter. In the latter case, the mature ovum becomes exposed to the water by rupture of the cells surrounding it, and is fertilized by spermatozoa floating in the water. It then is shed from the parent, and eventually gives rise to a young hydra. Here we see the beginnings of sexual reproduction between distinct individuals, but it is effected in a more or less irregular and haphazard fashion.

In the composite hydroids there are some beautiful examples of the division of labour into nutritive and reproductive functions—the “hydriform” zooids or polypites attending to the procurement

and assimilation of food, and "medusiform" zooids to the business of reproduction. This may be regarded as a foreshadowing of the development of distinct sexual organs in the higher metazoa. Indeed, in the same sub-kingdom, among the actinozoa—corals and sea-anemones—there are always distinct reproductive organs, both sexes being sometimes represented in the same individual, but often in separate individuals. Thus, even as low down as this, we begin to pass from hermaphroditism to complete sexuality.

In the vermes the sexes are often distinct, especially among the higher worms, and in the echinoderms they are almost universally so.

Among the molluscoidea, the polyzoa—in those cases where sexual reproduction occurs—are always hermaphrodite, and their colonies are formed by continuous generation. Among the brachiopoda we have either distinct or united sexes, as also among the lower classes of the true mollusca. But the typical gastropods have the sexes separate, and among the cephalopods—the highest class of the mollusca—the sexes are always distinct. The remarkable modification of one of the "arms" of the male octopod cuttle-fish for reproductive purposes is very noteworthy.

With the arthropoda we see the sexes much more definitely separated, and sexual association thus more fully developed. The crustacea are generally uni-sexual, but parthenogenetic reproduction occurs in some of the lower orders, and in the degenerate cirripedia—barnacles and acorn-shells—the sexes are generally united. Nor is this the only instance we shall notice of a degenerate condition being

accompanied by a correspondingly imperfect form of sexual association. The arachnida and myriopoda are unisexual, but in the special division protracheata, the curious primitive form, peripatus, has the sexes sometimes united. The insects are all unisexual, but some parasitic and degenerate forms can reproduce parthenogenetically. Among the higher insects the development of secondary sexual characters (differences in outward appearance between males and females) gives rise to forms of great variety and beauty. As is well known, among the social hymenoptera the "workers" are sexless; thus furnishing a case where the normal sexual association has been profoundly modified by the extraordinary degree to which the communal association has been carried in this order of insects.

Passing on towards the vertebrates, we find hermaphroditism in the tunicates or ascidians, which are generally believed to be a degenerate type of vertebrata; but in all true vertebrates there is sexual reproduction, and except in some fishes the sexes are separate. Sexual association may therefore be regarded as reaching its full expression only in this, the highest of the sub-kingdoms. However, the association is by no means equally developed throughout, but passes from an incomplete form in the lower classes to its most perfect manifestation in the mammalia. In most fishes and amphibians the ova are fertilized by the male after deposition by the female, but in the three higher classes sexual congress is universal. And with the progress of evolution through this sub-kingdom we find the sexual relationship becoming increasingly definite and increasingly permanent, till finally, in the

higher orders of the mammalia, an ethical element emerges, and the mere physical impulse becomes largely supplemented by a moral emotion.

We have next to consider the second great stage of the associative principle—parental association. This takes its rise very early in evolution, but not, of course, as early as the sexual association we have been examining; though, like all other results of the evolutionary process, the order of the three stages of association is by no means strictly serial. Parental association begins long before sexual association attains completion, and communal association begins long before parental association reaches its final development.

Parental association can scarcely be said to exist below the sub-kingdom of the arthropoda, but here we can detect the faint beginnings of an instinctive care for the offspring. Among the crustacea, female crabs and lobsters carry their eggs about until they are hatched. Some female spiders make a sort of nest for their eggs, and guard them carefully. Among insects elaborate provision for the safety of the eggs is sometimes made, and the parental care displayed among the communities of the social insects is well known. But here, again, the normal course of parental association has been remarkably modified in accordance with the highly developed social organization, the care of the eggs and larvae being attended to by the whole community of “workers”, and not by the actual parents.

Among the lower vertebrata parental association continues to develop, but it remains in the instinctive stage, and is aided in many cases by structural

modifications. In some species of fishes the females carry the ova on the belly till hatched, and in others a pouch for the eggs is formed by the skin and the ventral fins. The male stickleback makes a nest of grasses and weeds in which the eggs are guarded. In some cases the male carries the ova about in the pharynx, while in others abdominal brood-pouches are developed.

The amphibia exhibit various arrangements for the care of the eggs and the young. In the Surinam toad the eggs are placed by the male on the back of the female, where they form small pits in which the young are hatched and developed. In another case there is a large pouch on the back of the female for this purpose. Sometimes the male carries the eggs in a pouch around its throat, and in the case of the "obstetric frog" the male winds the string of eggs round his legs and buries himself in moist soil till they are hatched.

Among reptiles parental care, though not very frequent or pronounced, assumes a more purposive character. Some female snakes and crocodiles guard their eggs and young, haunting the localities where the eggs have been laid and attacking fiercely any enemies which may approach. The female python is said to coil itself around its eggs and thus to facilitate the process of incubation.

But it is among the two highest classes of the vertebrata that parental association acquires its most definite, permanent, and developed form, and the instances are so numerous and so familiar that it is needless to cite them. No one who considers the care which the fiercest birds and beasts of prey devote to the welfare of their young—the eagle

bringing food to her fledglings, or the lioness licking her cubs as they gnaw the meat she has provided—can fail to see clear instances of morals in the making. And among both birds and mammals, as is well known, the parental association becomes closer in proportion to the helplessness of the offspring when hatched or born, and to the length of time which elapses before they are able to help themselves.

We now come to the last and highest development of the associative principle, viz. communal association, or the association of individuals in communities for mutual protection, aid, and the achievement of the corporate welfare. Here intelligence plays the predominant part, and communal association, in the true sense of the word, is only seen among the birds and mammals. The communities formed by the social insects are indeed wonderfully organized and most perfectly adapted to their ends, but it does not seem likely that intelligence plays any part in them. The very perfection of the social arrangements in these communities—the mechanical precision with which the various functions of the social life are performed—indicate that they are brought about by blind instinct alone, and that reason, intelligence, and moral sense do not exist. But the social insects no doubt represent the highest possible achievement of terrestrial evolution along the line of instinct.

Among the three lower classes of the vertebrata the frequent groupings of large numbers of individuals in one locality seem to be the result of unavoidable conditions incidental to their manner of life rather than of deliberate choice—and deliberate

choice may be regarded as the essential feature of communal association in the true sense of the term. The groupings of fishes and frogs in large numbers are due to circumstances of spawning, in which vast numbers of eggs are hatched in one locality. Crocodiles and aquatic lizards dwell together in lake or river merely because their restricted habitat compels them to do so. They would get on just as well, or better, if each pair dwelt in solitude. In all such cases the aggregation brings no mutual advantage ; no aid is given or required ; no real communal life is held. It may be that this is due to some failure of brain development inherent in the whole line of reptilian evolution, aided by the oviparous habit of reproduction, and this would be almost sufficient to account for the extraordinary break in the continuity of animal evolution which seems to have taken place at the close of the Mesozoic period. Here the feeble beginnings of bird and mammalian life, aided by the awakening power of the great principle of association, might easily defeat in the struggle for existence the huge, powerful, but unintelligent forms of reptile and amphibian life of the Triassic and Jurassic ages.

It is only among birds and mammals, then, that communal association really obtains, and instances of this are too familiar to need mention. It is only necessary to point out the broad fact that among both birds and mammals the degree of completeness to which the association is carried varies generally with the degree of intelligence of the species, till, reaching its culmination in man, it forms the groundwork of rational ethics.

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Our brief survey has shown that the associative principle, commencing with the very beginnings of life in the form of sexual association, extends throughout the whole of organic nature known to us. And as the associative principle forms the basis of ethics, we reach the conclusion that the whole course of organic evolution has exhibited—dimly and vaguely, but none the less surely—a sort of preparation for the final development of the ethical principle. From the dawn of life we see evidences, first vague and feeble, then definite and strong, of morals in the making.

XIII

THE ORIGIN AND DEVELOPMENT OF MORALS

(The Hedonistic Law)

I. THE SCIENCE OF ETHICS

THE following article is an attempt to show in brief and systematic form the fundamental principles of Rationalistic Ethics. It will contain nothing that is not quite familiar to anyone who has studied morals in the light of evolution, but it may be of some interest as an attempt to define and elucidate a subject which is still to a great extent obscured and confused by its connection with supernaturalistic ideas. If the moral problem is ever to be properly understood it cannot be too strongly emphasized that it is a purely scientific problem, and has no more to do with religion than has geometry or physics.

For it seems to be a universal law that every department of human thought becomes really alive and progressive only in proportion as it emancipates itself from the domain of supernaturalism. All currents of thought tend to stagnate, all fields of inquiry remain hopelessly barren so long as they continue under the influence of religion. This is well seen, for instance, in the case of philosophy. All Oriental philosophies have been closely associated with religious ideas, and these philosophical systems have consequently been distinguished for their immobility and their unprogressive character. They have been from their very inception stagnant

and inert, and so they remain at the present time. Greek speculation showed the first attempt of philosophic thought to free itself from the trammels of mythology and to associate itself with rational knowledge, and hence it developed an activity, an intellectual strength and independence, unknown to the old Oriental systems. In the Middle Ages religion, now in the form of Christianity, again became dominant, and the Scholastic Philosophy affords a conspicuous and melancholy example of its influence. In those days philosophy was indeed "the handmaid of religion", and a wretchedly bad handmaid she was under the dominion of such a mistress. With the close of those dark ages, and the rise of the three immortals, Bruno, Descartes, and Spinoza, the second great emancipation began, and philosophy has ever since pursued its independent way, following the light of reason and leaving for ever behind it the shadows of supernaturalism.

Science exhibits the same phenomenon. All the ancient cosmologies were closely bound up with religions, and were conspicuously unprogressive. These childish products of human invention, resulting from imperfect and untrained powers of observation, once established in the beliefs of men, remained fixed and unchangeable as long as religion had any say in the matter. Astronomy was the first of the sciences to free itself from theological control, and hence, having had the longest start in the intellectual race, is the most advanced of all the sciences at the present time. Biology and Psychology have been the latest to emancipate themselves, and the latter is even now not entirely free from the influences of supernaturalism.

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Finally, the science of Ethics still remains very largely under the dominion of religion which, having from its very origin exercised an authority over morals, shows extreme reluctance to relinquish its ancient sway. Moral conduct is still supposed to be dependent on divine commands and supernatural sanctions. Right and Wrong are held to be matters within the jurisdiction of Churches and priests. Conscience is alleged to be a divine gift supernaturally bestowed, and is shadowed by that air of mystery which religion loves to throw around its fetishes.

It is for this reason that Rationalism must strive to make good its claim to Ethics as a science in every sense of the word. It is for this reason that we must spare no effort to wrest this, the highest of the mental sciences, from the obscurantist dominion under which it has lain so long, and from the deadening influences which have retarded its progress. For it cannot be denied that though we claim Ethics as a science it is still, owing to the tutelage of religion under which it has so long existed, far from being in a thoroughly scientific condition.

Science may be defined as systematized knowledge based on a foundation of demonstrated truth. And this demonstrated truth, derived from the two sole sources of human experience, observation and experiment, must itself be founded on certain fundamental principles or axioms of the human mind. In geometry and the mathematical sciences generally the whole body of knowledge is immediately derived from these fundamental axioms, and hence acquires its character of peculiar certitude

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and exactness. In the physical sciences observation and experiment come into play, and as both these methods of research are liable to error the certitude and exactness are not so great as in the mathematical sciences ; but nevertheless, a fundamental axiom—the law of causality—lies at the base of all observation and experiment, and this fundamental axiom is of the same nature as the “ necessary truths ” of mathematics—it contains a deeper and more basic element of truth than is yielded by experience.

If Ethics is to be regarded as a science it must come under this definition and must conform to these conditions. It must be a body of systematized knowledge based on a foundation of demonstrated truth, deriving its authority from some indisputable and fundamental axiom of the human mind. And obviously our first business in dealing with Ethics as a science is to find this moral axiom, if such there be.

II. THE NATURAL BASIS OF MORALS

Pure mathematics, geometrical and analytical, deals with relations of space and number, and hence its fundamental axioms are naturally found among those primary spatial and numerical relations which appeal to the intellect as “ necessary truths ”. Ethics deals with feelings of Pleasure and Pain, Desire and Aversion, and we may therefore as naturally expect to find the moral axiom somewhere among the primary and fundamental relations subsisting between these feelings. And here, as is well known, we do find it in the simple, absolute, and indisputable axiom that all sentient beings desire pleasure and avoid pain. That this is in the

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nature of an axiomatic truth as absolute as any of the axioms of mathematics we see at once when we define the ideas conveyed by the terms "pleasure" and "desire". We can only define pleasure as that which satisfies desire, and we can only define desire as a feeling which calls for pleasurable satisfaction, and hence the statement that all sentient beings desire pleasure is merely to say that they seek that which satisfies desire, which certainly looks axiomatic enough, and might even be regarded as a mere futile truism. But since the whole imposing edifice of mathematical science has been reared on axioms of the same kind, it may be that this moral axiom may not turn out quite as futile a truism as it seems at first sight to be.

The feelings of Desire and Aversion lie at the root of sentiments of Right and Wrong. These sentiments are indissolubly bound up with the promotion or inhibition of some natural outflow of feeling—with the satisfaction or non-satisfaction of some instinct—and hence they take their rise along with this, the most primal and universal of all instincts, the desire for pleasure and the aversion from pain. If this desire and aversion are absolute and inevitable, equally absolute and inevitable must be the feeling of the "rightfulness" of pleasure and the "wrongfulness" of pain. If sentient beings are so organized that they must desire pleasure and avoid pain, then surely for them pleasure must be "right" and pain must be "wrong". It may be objected that Right and Wrong are ethical sentiments, and do not apply to individual pleasures and pains except in relation to social welfare or the reverse. This is quite true of the developed sentiments of

Right and Wrong, but we are here dealing with the basis of morals and not with morality itself, and it cannot be denied that these sentiments are primarily associated with the mere feelings of satisfaction and non-satisfaction of the desire for pleasure. Even at the human stage of evolution, among the lowest savages, there seems to be no clear demarcation between the idea of wrong and the idea of injury. A savage, hurt by the accidental rolling of a boulder down a hill, would not clearly distinguish between the feeling aroused by such a mere injury and the sense of wrong which the civilized man would feel only if the boulder had been purposely rolled down the hill by some other human being in order to injure him. To the savage, beside the sense of the actual injury a vague sense of wrong would attach to either incident. We see the same thing in the case of very young children, even under civilization. A child accidentally hurting itself by contact with a piece of furniture will sometimes beat the table or chair in anger, and this feeling of anger seems to be precisely the same feeling as that with which it would slap another child in a quarrel. The true ethical feeling of moral right has developed out of the primary feeling of "individual right" which is not really a right at all, for a right must properly imply a claim which other individuals are under some obligation to respect—it must involve an element of reciprocity.

Thus we reach the conclusion that the feeling of desire for pleasure—or happiness if we prefer that word—and the feeling of right to pleasure, form, in their fundamental and primary association, the

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natural basis of morals. This view will not, of course, commend itself to some persons, especially to the supernaturalist who regards the moral sense as having been divinely bestowed. To him this grounding of morals on the selfish gratifications and unreasoning angers of beasts and savages will seem but a sordid and degrading theory—an ethic of the slime. But such a criticism would seem to justify the naturalistic view rather than to condemn it. If the physical organ of the moral sense—the brain of man—has arisen from the humblest beginnings in the simplest forms of sentient protoplasm, as few will now deny, it is only reasonable to expect that the functioning of that organ must have had equally humble beginnings in the world of consciousness.

III. THE NATURAL DEVELOPMENT OF MORALS

We now reach the important and baffling question over which all the pre-evolutionary theories of morals have stumbled. Granting the universality of an individual feeling of desire for and of right to welfare, how does that individual feeling become a social feeling? How comes it that the individual passes beyond a feeling of desire for and right to his own welfare, and acquires a feeling of the desirability and rightfulness of the general welfare of the community in which he lives? To this question the doctrine of evolution, as applied to a few simple and generally accepted data of Psychology, furnishes a satisfactory answer. These data are comprised under the two well-known psychological principles of Association and Abstraction, which are as

capable of accounting for the rise and development of the moral sense as they are of accounting for the rise and development of the intellectual faculties. And though the psychological processes of Association and Abstraction and the physiological processes underlying them are not yet completely understood, there is no more need of introducing an element of mystery in the one case than there is in the other. The physical association of individuals in communities must give rise to a mental association among their feelings. Each individual, feeling his own desire for and right to welfare, and perceiving a similar desire for and sense of right to welfare in other individuals in association with him, his feelings in respect of his own welfare become associated with other individuals' feelings in respect of theirs. And by the process of Abstraction, which always accompanies and supplements every process of Association, the feeling of a general, impersonal desire for and right to welfare gradually develops, but is always strictly limited to the actual community in which it develops. The mental association and the resulting moral sense never extend beyond the limits of the physical association in which they arise until this physical association becomes itself extended, which seems to be a sufficiently good indication that the one is directly dependent on the other.

But this perceptive or intellectual association is not the only one, nor does it account for the complete ethical sense. An individual may thoroughly recognize and comprehend the abstract notion that the community possesses a right to welfare, without feeling any sense of obligation on

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his own part to act in furtherance of it, either generally or in the case of particular individuals. The moral sense would be incomplete. But along with this intellectual association there operates at every stage of the advance an even more fundamental process of emotional association. This is exhibited in the familiar fact of sympathy—the fact that among associated animals a certain feeling of pleasure is aroused in each individual by a perception of the pleasure of other individuals, and a feeling of pain by the perception of pain, and this is explained by psychologists as an association between the perceived pleasures and pains of others and similar pleasures and pains experienced by the individual itself. This it is that supplies the emotional element in the moral sense, that gives it its warmth and glow. This it is that identifies the feelings of the individual with those of his fellows ; that enables him not only to perceive but to feel the joys and sorrows of others as he feels his own, and gives him the sense of moral obligation or duty with regard to them.

For convenience of discussion the natural basis and the natural evolution of morals have been treated separately, but it must be remembered that no such separation really exists. Man has never existed merely as an individual. From the moment of his birth every human being has been a social animal, the earliest social group being the family into which he was born, even if that family existed apart from any higher association. So the evolution of morality must have arisen and begun to operate coevally with its basis, and the pleasures and pains of the self must have been associated

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with the pleasures and pains of others from their very inception.

Thus do we arrive, by way of a perfectly natural process, at the fundamental principle of morality, the Law of Right and Duty—for Right and Duty are merely two aspects of the same thing. The welfare of the social aggregate is the supreme Right. The obligation of the individual in respect of that welfare is the supreme Duty.

IV. THE SOCIAL DEVELOPMENT OF MORALS

This fundamental and universal ethical standard or Law of Morality having been reached by way of natural evolution, further advance proceeds on the social plane and hence may be termed the social evolution of morals. The abstract Law of Morality, finding its supreme sanction in the welfare of the social aggregate, remains ever the same, but as the aggregate itself expands the law acquires a wider and wider scope, a fuller purport, and a deeper significance. The earliest social group is the Family, and as families become associated into Clans, clans into Tribes, and tribes into Nations, the group allegiance broadens and extends. The sense of duty in respect of the family—the family conscience—evolves into the tribal conscience, till finally the fully developed national conscience is attained. And on the higher plane as on the lower this ever-widening process of Association is accompanied and supplemented by the process of Abstraction. The lower allegiance does not become entirely supplanted by the higher, but merges into it, and the elements common to both are woven

into a higher synthesis. Allegiance to the tribe is not in itself antagonistic to the family allegiance, for there are certain conditions necessary to the welfare of the family which, for that very reason, are also necessary to the welfare of the tribe—such, for instance, as the protection and care of the young. Similar common elements enter into the association of tribes into nations, and with every successive expansion in the scope of the moral sense the process of Abstraction enforces and confirms the moral sanction. If any element of social duty recognized as right for a lower group is also found to be right and necessary for the higher group into which it passes, that element of social duty becomes thereby still further strengthened and moralized. There is a continuous process of adjustment of relations between the lower aggregate and the higher one into which it is merging—a striving for the attainment of an equilibrium between their conditions of welfare. There must always be certain conditions of welfare equally important for both aggregates, since both are acquiring a common interest, and these favourable elements are retained and incorporated into the higher moral code, while the antagonistic elements disappear. And the process is even yet incomplete. Associations between nations, necessitated by modern conditions of trade and mutual intercourse, are slowly developing what might be called a super-national conscience, though yet but a vague and feeble one.

The final outcome of this process is to evolve a body of moral feeling which is what we commonly call the “conscience of humanity”. The rights

and duties coming under this code are rights and duties common to all social groups—the conditions of life and conduct essential to the welfare of men in association with one another, whatever the form of that association may be. These are the final residua, the pure gems of moral truth remaining after the dross has been removed; as in a gem-sorting machine the heavier and more precious stones are left after the light and worthless materials have been swept away by the cleansing current. This moral code is what is known collectively as the “Rights of Man”, but instead of deriving its authority from the supposed “natural rights” of individual man in his primitive state, as was at one time held, we find that it has been slowly developed throughout long ages of social evolution, and derives its high and paramount authority from the moral law.

Finally we have to consider the purely sociological factor in Ethics. Natural and social evolution have prepared the ground, but the growths that spring up thereon are of human cultivation. The moral sense of man—the conscience of humanity—everywhere and always the same, provides the fertile soil in which these social growths are planted and can flourish; and very monstrous and grotesque some of the earlier growths have been. These are the “social institutions” which have prevailed among men from time to time, rising, flourishing, and dying out as man’s knowledge may advance and his relations to his environment may vary. And these social institutions fall broadly into three groups—Custom, Religion, and Law.

THE ORIGIN AND DEVELOPMENT OF MORALS

Custom seems to have been the most primitive form of social institution. No community of men, however primitive and savage, has yet been discovered without some form of Custom firmly established among them, and even the more intelligent among the social animals exhibit certain settled modes or habits of conscious behaviour which may quite fairly be described as Customs. And in the primitive stage, as is well known, these customs often assume the most grotesque forms. It would appear, indeed, that no rules of conduct could be too absurd, no commands or prohibitions too purposeless, no "taboos" too unreasonable to be imposed and sanctified by custom among savages. But in every case the underlying sanction is the moral sense, for all these customs are followed and respected because they are supposed to bring about the welfare of the community in which they have arisen—because they are supposed to be "right".

Religion follows very closely on Custom, indeed they are usually found together, and in the case of Religion the moral sense plays an even more conspicuous, though not a more real part. The commands of the deified chief or king, and later of the supreme God, are to be obeyed because they are "right", and religious codes and decalogues are supposed to have been supernaturally given, though the precepts they lay down are based on a moral sense more or less firmly established in the consciences of men. So strong, indeed, is the moral sanction that its power is invoked to support purely ritual or sacerdotal codes which have no real moral significance at all. And as with Custom so with Religion, absurdities, falsities, and cruelties

abound. Religious institutions have often been marked by appalling atrocity, and religious rites have often reeked with blood. No more striking instance can be given of the potency of the moral sense in man than the case of the unresisting victims of human sacrifices. We find no record of any protest against this ghastly superstition, even among the more advanced communities. The silent submission of its victims must have been mainly due to a conviction that their sacrifice was for the common good—for securing the welfare of the community by propitiating the ghost of the departed chief or king, or the powerful national God—and that hence it was “right”.

Last in order of time comes Law, and as definite systems and codes of law do not find their place among social institutions till societies have become more or less civilized, and men have advanced in knowledge and intelligence, Law does not, on the whole, exhibit as many marks of primitive ignorance as do Custom and Religion. But, like them, it is of course based on the moral sense. However wicked may be the law, however cruel the despot who enacts it, there is always claimed for it the sanction of Justice and Right.

Thus, then, do we see that Ethics is truly a science, and that it owes nothing, or less than nothing, to Religion. The higher religions have done something towards enforcing morality by holding out hopes of heaven and threatening terrors of hell, but it is questionable whether this has not been more than counterbalanced by their evil service in turning the straight course of moral conduct into the crooked paths of cruelty and wrong.

XIV
THE INTUITIONAL FACTOR IN
MORALS
(The Moral Law)

THE ethical problem presents itself in two main aspects. The first involves the question of the external standard of morals, viz.: What is moral conduct? The second relates to the internal sanction of morality and is expressed by the question: What is the true motive for moral conduct on the part of individuals and how can it be logically connected with the external standard?

Satisfactory answers to these two questions would completely solve the problem, but it is remarkable that while ethical speculation has from the earliest times been practically agreed as to its answer to the former of them, its reply to the latter is still the subject of some controversy. It seems to be generally agreed that moral conduct consists of such actions as are essential to the fullest corporate welfare of the social group to which the standard applies, and ultimately (in its relation to the world at large) of all human beings. But answers to the second question still differ, and—disregarding the religious or supernatural sanction—may be broadly classed under three heads:—

- (1) Egoistic Hedonism or “enlightened self interest”. It is questionable whether this theory is now seriously held by many. Though it may sufficiently account for conduct into which hedonism enters in however small a degree,

it fails entirely to account for those highest examples of moral conduct in which hedonistic motive plays no part whatever. It also involves a logical fallacy. If I refrain from cheating someone over a business transaction solely because I recognize that "honesty is the best policy" for me, and not from any feeling that honesty is the "right" policy, my egoistic motive can only be based on the fact that I am living in a community wherein dishonesty is disapproved of and entails a risk of punishment. But since all human beings are supposed to be actuated by the same egoistic motives it is difficult to see how such a moral sentiment as a disapproval of dishonesty could ever arise in a community of them, and in the absence of such a sentiment the egoistic motive would lose its logical basis.

- (2) Altruistic Hedonism, or the classical Utilitarianism of Bentham and his followers. This, which makes "the greatest happiness of the greatest number" the aim of moral conduct, is so well known that it needs no description. It must be pointed out, however, that though claiming to furnish a purely moral sanction it still makes individual happiness its sole motive. It seems to regard the social welfare as merely the sum of all the separate individual welfares, and is logically nothing more than egoistic hedonism extended from one individual self to the "greatest number" of individual selves. Moreover, in common with all ethical systems which base moral conduct on considerations of

happiness, it betrays a logical weakness in the relationship it sets up between individual and social happiness. Why should I so act as to bring about the individual happiness of others when, in so acting, I feel that it is my duty to disregard my own happiness? How can another's, or many others', individual happiness serve as an end for me when my own noblest impulses tell me that mere personal happiness is to be held of no account?

- (3) Evolutionary Ethics. This appears to provide the true solution of the problem, for it bases moral conduct, not on any considerations of happiness whatsoever, but on a moral instinct or intuition, necessarily evolved under social conditions and necessarily (though unconsciously) directed toward the social welfare. Such a basis of moral conduct is built on the firm foundation of evolutionary science, and, being independent of hedonistic implications, is free from the logical objection which has just been referred to as a difficulty in the Utilitarian theory. This moral instinct, or intuition, is, of course, what is commonly called "conscience". Of its existence in all sane and normal human beings there can be no doubt, for all experience affords an irresistible conviction of its reality and power. The only controversy is as to its nature and origin, for while religion claims it as a mystic faculty divinely implanted in the human mind, science regards it as a product of mental evolution. That this latter view is the true one, and that the human

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conscience is a purely natural faculty of the mind developed through a gradual process of evolution, becomes fairly clear when we tabulate all the physiological functions leading up to and constituting behaviour in a serial order, from the lowest neural and psycho-physical reactions to the highest manifestations of moral conduct. We may tabulate them as follows :—

(a) Automatic action. Primary vital processes independent of both consciousness and volition.

(b) Reflex action. Psycho-physical activities independent of volition, but sometimes accompanied by consciousness.

(c) Instinctive behaviour. Psychic activities, being always associated with consciousness. Probably involuntary in early stages, but volitional during later developments.

(d) Hedonistic conduct. Always conscious and always volitional. Actuated by desire for pleasurable feelings and aversion from painful feelings, whether as affecting the self or others.

(e) Moral conduct. Always conscious and very strongly volitional. Independent of any desire for pleasure or aversion from pain, but entirely controlled by a sense of “right” or “duty”, and often acting in opposition to the hedonistic impulses and overcoming them.

Here we see how the conscious and volitional elements in animal behaviour and human conduct are developed in successively higher degrees and

a gradually ordered series—such a series as we find everywhere characterizing the products of evolutionary development. Hence it is natural and reasonable to conclude that the sense of right and duty lying at the root of moral conduct is an innate and fundamental quality of the human mind, evolved in response to social needs and directed to the promotion of social welfare. And this view completely escapes the difficulty of bridging the gap between the “welfare of the individual” and the “welfare of the community” which besets all systems of hedonism or utilitarianism however altruistic they may be. For on this view the welfare or happiness of the individual becomes of no account as such, the sole motive of moral conduct being the innate moral sense which, though of necessity individually developed, has been so developed for the sole purpose of social and racial welfare. Moral conduct has, in fact, to be completely differentiated from hedonistic conduct, and the moral motive has to be regarded as operating on a principle of quite another order than the simple one of a balance between conflicting desires for happiness. Thus there is no need to adopt Professor James’s paradoxical definition of moral conduct as “action in the line of greatest resistance”, any more than we need resort to paradox when we see a small weight outbalancing a greater one in the steel-yard balance. Here the mechanical principle of the lever modifies the simpler principle that a heavier weight overbalances a lighter one.

This change in the fundamental conceptions of ethics brought about by the application of evolutionary principles to human social development

bears a close resemblance to the change in certain philosophical conceptions brought about by the same cause. The pre-evolutionary views of the "Experiential" school of philosophy as to the origin of our *a priori* cognitions of "necessary truths" in mere individual experience are no longer generally held; and the old utilitarian ethic, similarly based on conceptions of individual pleasures or avoidance of pains as the sole motives of moral conduct, has given place to the conception of a socially evolved and innate moral sense. Indeed, the parallelism between philosophical and ethical thought goes deeper than this resemblance in the influence wrought on them by the doctrine of evolution. Philosophy and ethics, regarded in this intuitional aspect, possess certain characteristics in common which seem to indicate a profound and fundamental community of nature and origin as products of mental development. It will accordingly be of interest to examine these common elements.

A philosophical theory of knowledge has to draw a clear distinction between truths of intuition and truths of experience. The former comprise those fundamental and necessary dicta of the human intellect which form the basis of all reasoning processes, which furnish the indispensable conditions of all thought, and the truth of which is self-evident and indisputable. They are, moreover, always of an abstract order and of universal application. Truths of experience, on the other hand, depend entirely on evidence or proof for their recognition and acceptance as truths, such evidence or proof consisting of their inclusion in some wider

truth already established. Such are most of the truths of science as well as the ordinary facts of everyday experience which form the subjects of our reasoned belief, and they may be described as concrete or particular truths as distinguished from the abstract or general truths of the former class.

In precisely the same way has a philosophical system of ethics to draw a distinction between hedonistic conduct and purely moral conduct as classed under the headings (*d*) and (*e*) respectively in the foregoing list. Hedonistic conduct is based entirely on considerations of pleasure and pain, of happiness and unhappiness, whether affecting the self or others. It takes cognisance of individual cases and of particular circumstances, the same course of action being sometimes capable of bringing about beneficial, and at other times harmful, consequences. It was this particularity and concreteness inherent in the "greatest happiness" principle that gave the old Utilitarians so much trouble in laying down rules of moral conduct when they involved the balancing of advantages against disadvantages, or calculating whether the total sum of "happiness" would be increased or diminished by some given line of action. On the intuitional view, on the other hand, moral conduct is controlled by an abstract, innate, and unchallengeable sense of rightness or wrongness independent of all concrete considerations of pleasure or pain, and is as sharply contrasted with hedonistic conduct as abstract intellectual truth is contrasted with the concrete truths of experience. As it would be irrational and absurd to demand evidence for an abstract truth of intuition while a concrete truth

of experience must depend on evidence for its acceptance ; so, with similar strength of contrast, moral conduct ceases to be truly moral as soon as any consideration of happiness actuates it, while hedonistic conduct is based on a desire for happiness as its natural and rightful motive. This contrast is indeed none other than that between our ethical estimates of actions prompted by motives of justice on the one hand or of beneficence on the other, and it can be illustrated by many a familiar example. Take the case of someone responding to an appeal on behalf of a charitable institution, say for the endowment of a cot in a Children's Hospital. One man may write his cheque merely from a vague sense of obligation, feeling no pleasure in the action and dismissing the matter from his mind with a sense of relief. Another man, of keenly benevolent disposition, would feel a glow of pleasure in the consciousness that his action will aid in the relief of distress, and he might even seek to prolong that pleasure by occasional visits to the Hospital and kindly talks with the little sufferers whom he is befriending. There is no question as to which of these two men is deserving of the greater approval. On the other hand, no one is expected to feel a glow of moral pleasure when writing out a cheque in payment of a debt, though this latter, being an act of justice, is on a higher ethical plane than the purely hedonistic act of beneficence exemplified in the former case.

The relationships between the abstract and concrete elements in the spheres of philosophy and ethics exhibit an equally striking similarity when we consider their origin and development. The

slowly developing intellect of primitive man, incapable as yet of any abstract ideas and confronted only by concrete experiences, could but interpret the world around him—so far as it was truly interpretable at all—in concrete terms and their relations, as is clearly shown at the present day by existing savage peoples. Nor would the acquisition of abstract ideas have been of any use to man at that early stage while he was engaged in a pitiless struggle for existence among the stern, material facts of life. It would be only after long ages of mental growth, after a more perfect development of language and a more perfect organization of societies, that the conflict would be raised to the intellectual plane, and the acquisition of reasoning power and the recognition of abstract truth would become both possible and useful.

The development of the moral sense must have been controlled by similar conditions. When man's intelligence was in its infantile stage and his social sympathies were vague and feeble, direct hedonistic impulses must have been the only ones capable of prompting conduct conducive to social welfare. Hence a direct desire for pleasant and aversion from unpleasant experience, egoistic in origin, but by emotional association becoming increasingly altruistic through family, clan, tribe, etc., probably formed the ruling motive of all social conduct long before a sense of right, duty, or justice could have arisen. This, too, is plainly shown by many existing savage tribes, among whom feelings of sympathy and benevolence are sometimes strongly exhibited, while conceptions of justice or honour are quite unknown. In this early stage

hedonistic motives would suffice for the requirements of social welfare, but as societies came to include wider groups and social organization became more complex and more interdependent a different motive of conduct would be needed. Under such conditions there would frequently arise a need for conduct essentially beneficial to the social group but not immediately or obviously bringing personal happiness to the individual of whom it is demanded—sometimes, indeed, even entailing an actual diminution of such happiness. How could such moral conduct be brought about? Only by the development in each individual of an organized and innate impulse toward the performance of such conduct in complete disregard of any considerations of happiness either immediate or remote. This would take the form of an innate sense of duty or obligation—that mental faculty, in short, which is commonly called “conscience”.

Thus it would appear that a truly rational system of ethics must have a dual basis, and that no system based solely on hedonism can be logically satisfactory. But the two elements of the dual basis form the emotional and intellectual components of one mental development and are neither independent of nor antagonistic to each other. The former component is hedonistic in origin and is rooted in the primal feeling of the *desirability* of happiness, while in the latter this feeling is moralized as an intuitive cognition making the *rightfulness* of happiness the criterion and condition of its desirability. These may be regarded as the fundamental data of ethical science.

XV

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“ There must result at length a certain state of the brain and its functioning that seems to be the last result of a process of acquisition, experience and heredity. Thus the individual cannot divest himself of these transmitted forms of thought, since they are inherent in the very organization of his brain ” —BUCHNER, *Last Words on Materialism*, p. 65.

“ For if man is a product of Nature like all the other products, his relation to his environment must also be thoroughly natural and orderly ; or, in other words, the outer world of Nature and the inner world of Mind must stand in a necessary and orderly internal relation to each other.”—*Ibid.*, p. 290.

It is sometimes of great interest to review some old scientific or philosophical controversy of half a century or so ago, in order to see how it compares with our present ideas, and to estimate what progress, if any, has been made by human discovery or speculation in the interval. Such an opportunity is afforded by the well known discussion between Spencer and J. S. Mill on the philosophical meaning of Necessary Truths—those ultimate and irresistible dicta of human reason which we feel compelled to accept as absolutely and universally true. The ground of the controversy between these two great thinkers (who held views so much in accord on other questions) lay, as everyone knows, in the fact that Spencer held the validity of Necessary Truths to be based on the innate constitution of our minds as derived from all ancestral experience ; while Mill maintained that, despite their apparently

transcendent certitude, they were all derived from individual experience, and differed from other generalizations of such experience merely in the fact that they were based on much wider inductions.

Though it would perhaps be premature to say that the question has been definitely settled, modern speculation seems inclined to pronounce in favour of Spencer's view, and the reason is not far to seek. Like so many other doubtful questions, this question has received no small measure of illumination from the great idea of evolution which has informed and lighted up whole regions of thought since Spencer and Mill wrote. And Spencer was pre-eminently an evolutionist, while Mill was not. The former, as we know, was absolutely saturated with the idea of evolution. The stupendous task to which he devoted his entire life was completely inspired by that idea, and he himself came very near to anticipating Darwin in the actual discovery of Natural Selection. Mill, on the other hand, was distinctly pre-evolutionist, and even Darwin's great theory seems to have aroused in him but a languid interest. He was the last great apostle of the "experiential" school of thought, and to this school the notion of innate ideas, of an intuitive element in reason, or of *a priori* truths, seemed to be anathema. And we can see the reason for this, since, in the absence of an evolutionary interpretation, the only explanation of such mental qualities would be a "supernatural" one, and this, to most of these thinkers, was logically barred. Under these conditions it might be supposed that Mill should have gladly welcomed Darwin's theory and the rise of a new evolutionary school, as affording a scientific way out between

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the opposing views of sheer empiricism and supernatural intuitionism. But it is not easy for a thinker who has spent all his life in following up a certain line of thought and expounding a definite philosophy to assimilate new ideas opposed to these ; besides which, all the implications and consequences of the new theories of evolution had not been fully recognized in Mill's time.

When we come to consider our modern views on this subject we seem to find that while Spencer was probably right as far as he went, he would have got still nearer the truth if he had gone farther.

Spencer found the basis of Necessary Truths in the inheritance of organized nervous structures wrought out of the accumulated experiences of the human race, but there seems to be no reason to stop here. Monism, drawing no distinct line between human and pre-human evolution, follows the process back to the very beginnings of life. Indeed, it goes farther still, for drawing no fundamental distinction between the living and the non-living, or between the mental and the physical worlds, it is free to seek the basis of these ultimate conceptions in the primal nature of reality. The ultimate existence, functioning in time and space, must function in accordance with time and space conditions, and the earliest gleam of consciousness, as it awakens in the earliest forms of sentient protoplasm, must function in accordance with such pre-existing conditions—must express itself under a definite, determined, and necessary order. And as sentiency advances through all its stages of structure and function from the earliest speck of protoplasm to the developed brain of man, it

continues ever under the control and guidance of the psycho-physical process of reality, and hence its fundamental elements—its raw material, so to speak—must exhibit the characteristics of necessity and of truth.

This advance of intelligence takes place through the two well-known mental processes of Association and Abstraction to which a brief reference must now be made. Though it is often convenient to regard these two great mental functions separately, they are really parts of one and the same process. Association is the clinging together in consciousness of perceptions which agree among themselves in some common element, and their consequent segregation from others which do not possess this element; while Abstraction is the drawing out or separating of this common element from the other elements of the associated group, and the cognition of it as a distinct concept. Hence Association and Abstraction must go hand in hand, and the second is impossible without the first, but Abstraction is the process with which we are here more immediately concerned, as it is the process pre-eminently involved in the formation of Necessary Truths, for all these irresistible concepts are invariably abstract concepts.

Abstraction is usually referred to as a mental process consciously performed by the individual, but it is evident that the neural structures and functions involved in the process must have been developed throughout the ancestral history, and it is this aspect of the question which has to be here considered. Like the instinctive faculties, the faculty of Abstraction is a product of age-long

evolution, and indeed there is a close analogy between the two, for these ancestral products of Abstraction which we call innate ideas occupy a position in the sphere of the intellect very similar to that occupied by instinct in the sphere of the feelings. A peculiar quality of necessity and certitude characterizes them both, and the fact of their gradual evolution is equally evident from observation ; for just as instincts are seen to pass through stages of development, so the faculty of Abstraction is seen to do the like, since the lower races of men possess it in very small degree, whilst it is doubtful whether even the most intelligent of the lower animals possess it at all. Now, though Instinct is admitted by all modern biologists to be due to the existence of definite neural structures and functions imposed upon the race throughout its evolution, yet it can only be called forth in the individual by some actual experience of the outer world. For instance, the chick possesses an instinct which enables it to pick up grains of corn a few hours after it is hatched, but this instinct is not aroused till it actually sees the grains of corn. The visual image of the grains of corn on the retina of the chick's eye affords a stimulus which arouses the dormant, pre-formed instinct to activity, and once aroused it acts with perfect precision.

In a remarkably similar way does the faculty of Abstraction seem to act in the formation of an "intuitive" or "innate" conception, though the process operates, as it were, on a higher plane, this intellectual act of Abstraction taking the place of the mere act of perception which arouses an instinct. But just as the perception of an external

stimulus can arouse an instinct, by a sudden flash, as it were, into instant and precise activity, so does the process of Abstraction seem to give the mind, as by a sudden flash of intellectual light, the unerring cognition of a Necessary Truth. And just as the instinct, once aroused, needs no practice to make it more perfect, so the Necessary Truth, once realized, needs no further experience to strengthen the conviction with which it is held.

Let us take as an example some simple spatial relation which to our minds seems absolutely self-evident, such as the relation that two straight lines cannot enclose a space. Before the faculty of Abstraction is acquired the self-evidence of this spatial relation would not be apparent—this “necessary truth” would not be realized. The mind, let us say, of Palæolithic Man in its converse with the external world would perhaps perceive the existence of innumerable lines of all sorts, straight and curved, long and short, parallel and intersecting. It might also perceive the existence of enclosed spaces of all sorts, spaces bounded by straight lines, by curved lines, or partly by one and partly by the other. This would be “experience”, and this experience might go on for age after age, but as long as the power of Abstraction remained undeveloped the truth that two straight lines cannot enclose a space would never be realized, because the abstract ideas “straightness” and “enclosure of space” would not have been formed, and hence no relation between them could be cognized. But now suppose that in the course of ages the faculty of Abstraction becomes developed, and that this particular abstraction is made. Immediately, as by

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a flash of intuition, the relationship is perceived. The mind, now holding a clear idea of "two straight lines", and a clear idea of "enclosure of space", sees by a necessary insight that the one is incompatible with the other. The necessary truth of the relationship is realized once for all, absolutely and universally.

How can we account for this strange faculty of insight? The hypothesis of Psycho-Physical Monism seems to furnish a satisfactory answer.

The "experiential" school of philosophy regarded Mind as wholly a product of experience, and was therefore compelled to regard all mental processes, including our most fundamental intuitions, as having been derived from experience alone, either individual or racial. Monism, on the other hand, so far from regarding Mind as a product of experience, looks upon it as a primary and eternal principle of Reality, operating, along with the material principle, in developing those psycho-physical relationships which culminate in "experience"—that is, in perceptual knowledge. The general concepts derived from this perceptual knowledge—the ultimate universals yielded by Abstraction—thus rooted as they are in the psychic nature of Reality, need no appeal to experience for their validity. If the principle of Mind be as primal an element of existence as the principle of Matter the ultimate relationships among mental processes—the fundamental laws of Thought—might reasonably be expected to possess a validity as absolute, as universal, and as unconditioned as the ultimate relationships among physical processes, that is the laws of Things. Indeed, in the

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ontological world of Reality these two orders of relationships would, according to the Psycho-Physical hypothesis, be held to be merged in one universal and unitary order of relation.

Thus we reach the conclusion that these *a priori* conceptions are not *products of experience*, however widely extended, but are pre-existing psychic functions, emergent at the higher levels of the psycho-physical process, and *revealed through experience* by the mental operation of Abstraction.

XVI

RELATIVITY IN THE MORAL WORLD

THE principle of Relativity which dominates modern scientific conceptions of space, time and motion is a purely objective principle. It is solely concerned with the objective relationships between points and distances in space, instants and durations in time, velocities of movement and so on; and the hypothetical "observer" who is so frequently introduced into its demonstrations is supposed to be a merely passive spectator whose observations contain no subjective factor. All "observers" who observe identical movements under identical relationships of space and time would observe them in identically the same way. In fact this hypothetical observer need not be a sentient being at all, and might effectively be replaced by a mirror or a photographic plate, with the advantage of definitely excluding any subjective element.

But there is another and deeper kind of Relativity than this. It is that purely subjective Relativity for the complete exposition of which no Einstein has yet appeared and no mathematical formulæ are available, for this higher form of Relativity is based on equations—"personal equations"—compared with which the Lorentz Transformation is simplicity itself and which lie entirely beyond the scope of the Tensor Calculus.

This incalculable principle lies at the foundation of all ethical and social science, and its due recognition would perhaps effect as great a revolution in

our moral conceptions as Einstein's objective principle of Relativity has done in our ideas of space and time. For the fundamental datum of current moral science is that elusive mental state called Happiness, and in the light of a subjective theory of Relativity it might turn out that our common notions of happiness have no more correspondence with reality than our common notions of space and time have with the "space-time" of the objective world. Its first effect would be to emphasize the truth that happiness is not something definable and measurable. That, indeed, it is not a "thing" at all, but a mode of inter-action or relationship between a multitude of factors—a function of many independent variables which may be roughly grouped in the two classes we call subjective temperament and objective condition, and which differ widely between different individuals and in the same individual at different times. Hence it would probably declare our present ethical and social theories to be as inadequate to a true philosophy of morals as the physical Relativity theory has shown Euclidean geometry to be for a true description of space.

The Utilitarian theory in morals is perhaps as responsible for the perplexities of ethical science as the Ptolemaic system of astronomy was for the perplexities encountered by the ancients over the apparent movements of the sun and the planets. And the trouble in both cases was due to the same kind of error, for while Ptolemy made the mistake of putting the earth immovably at the centre of the solar system, the Utilitarians made the mistake of putting individual happiness at the centre of the

moral system, with the result of inevitable confusion in both cases; in the former case because the supposedly fixed centre was itself in constant movement, and in the latter case because the supposedly absolute entity was itself a relative and extremely variable function. The chief perplexity of the Benthamites lay in the question, How could "the greatest happiness of the greatest number" ever furnish a standard of morals when no two individuals' standards of happiness are precisely alike, and what would be the greatest happiness for one man might quite possibly be regarded as the greatest misery by another?

Since happiness is entirely relative to the individual who experiences it there appears to be no possibility of making an absolute comparison between such individual experiences. A type of mind capable only of enjoying the sensuous forms of pleasure would entertain a vastly different estimate of happiness from that entertained by the man of lofty character, the philosopher or the idealist, and each of them could no more compare his own happiness with the other's than two persons suffering from toothache could decide which of them is experiencing the greater pain. The higher and lower forms of happiness experienced respectively by the higher and lower types of mind would equally constitute for each of them that "greatest happiness" which the utilitarian theory lays down as the ultimate good. Each of the two groups of hedonistic experiences necessarily forms a closed system personal and relative to the experiencing subject and quite incommensurable with the other, yet equally true for each; just as two aspects of

the same object viewed from two different points differ from each other, though both are equally correct as partial components of one objective whole. All we can definitely assert is that each type of mind finds more emotional satisfaction in one type of happiness than in another, but we are quite unable to draw a definite comparison between the emotional satisfactions which they respectively experience.

This point will perhaps be made clearer if expressed in symbols. Happiness may be regarded as a product of two factors (or, as suggested above, a function of two variables), namely an objective factor, the external conditions of happiness, and a subjective factor, the personal capacity of response to these conditions arising out of the intellectual and moral nature of the individual. Let us consider the two types of character, the higher and lower types already referred to, and call their subjective factors X and Y respectively. Also let A and B represent the external conditions respectively contributing to the "greatest happiness" of the two mental types X and Y . For example A might represent facilities for philosophic study, for scientific pursuits, for artistic enjoyment, etc.; while B might represent opportunities for such sensuous gratifications as immoderate consumption of beer at public house bars, or loafing at street corners on the kindly maintenance of the Dole. Thus AX and BY would stand for the two types of "greatest happiness" respectively, and the question would be, how could we decide which is the "greater" of the two? It is, of course, obvious that each type of mind would find more

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happiness in the objective conditions consonant with its own character than in those of the opposite kind, so we should know that :—

$$\begin{aligned} &AX > (\text{is greater than}) BX \\ &\text{and } BY > AY. \end{aligned}$$

We should also be pretty certain that the philosopher finds more happiness in his intellectual pursuits than the sensualist would find in such pursuits, while the latter could discover joys in the atmosphere of a public house which the philosopher would entirely fail to appreciate. These two hedonistic relationships can be concisely expressed in the following inequalities :—

$$\begin{aligned} &AX > AY \\ &BY > BX. \end{aligned}$$

But it is easily seen that none of these four relationships or any combination of them gives us any information as to whether AX is greater or less than BY , that is, whether the happiness of the philosopher in pursuit of intellectual gratifications is absolutely greater or less than that of the sensualist in pursuit of physical ones.

This hedonistic Relativity applies not only to the experiences of different individuals but to those of the same individual at different times. J. S. Mill's well known argument that the happiness derived from intellectual pursuits must be absolutely greater than that derived from sensual ones because those who have experienced both always acknowledge the superiority of the former, does not seem quite satisfactory. No human being can ever experience

both types of happiness at the same time and under the same subjective conditions, for the very fact that the one type has given place to the other shows that *the personal factor has changed*. The staid and sober citizen of mature age, burdened with the cares and responsibilities of business and family, and with his capacities for physical pleasure on the wane, is subjectively a different person from the gay and irresponsible youth who sowed his wild oats and "had his fling" thirty or forty years before. The saintly Augustine writing his "Confessions" must have been a very different personality from the dissolute youth living his life of sensual pleasure in the gay city of Carthage. In all such cases the individual's judgment as to the superiority of such happiness as he now prefers is a necessary result of the change in his personal equation. If he could become rejuvenated and live his youthful years over again that judgment might quite possibly be reversed. He is, in fact, observing his experiences from two different subjective standpoints, and hence can no more pronounce a judgment as to their absolute values than the "observer" of the physical Relativity theory can decide as to the absolute values of space and time measurements in two reference systems which are moving relatively to each other. The only absolute judgment possible in the case of the two types of experience here considered would have to be pronounced by some being capable of intellectually comparing them as objective facts while unaffected by any emotional experience of either—a being to whom human thoughts and feelings would be as objects capable of exact measurement and comparison.

But such a being would have to be of a supernatural order.

It would thus appear that when qualitative distinctions are taken into account varieties of individual happiness are *absolutely incommensurable*, and the Utilitarian theory of morals, being applicable only to the simplest quantitative measurements of happiness, here completely fails. For not the "greatest" happiness but the "right" happiness—the "best" happiness—seems to be the true ethical aim, and hence it follows that happiness cannot be the supreme standard since there appears to be some further standard by which the quality of happiness has itself to be judged.

Such a criterion would have to recognize the ultimate element of truth common to both of the opposing moral systems which have, in the main, divided all past ethical speculation—the theory of an Absolute Good transcending and independent of human experience, and that of a relative Good derived from and conditioned by human experience. And hence it would have to be sought for in that psycho-physical process which, starting deep down in the cosmic order and reaching its consummation in the moral order, we term evolution.

